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THE ROENTGEN DIAGNOSIS OF ACUTE INTESTINAL OBSTRUCTION*

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McIver[1] speaks of a number of diverse diseases and conditions grouped under the term "acute intestinal obstruction" which have as their one most constant characteristic an abnormal stoppage of intestinal evacuation. This inability of the bowel properly to propel and expel its contents results in an intraluminal accumulation of fluid and gas sufficient in quantity to permit of early demonstration on roentgen films.

The fluid which must be constantly and invisibly present in health is composed of normal alimentary juices amounting to approximately seven liters daily. The gas is of diverse origin, the three possible sources being ingestion, diffusion through the bowel wall and endogenous formation by putrefaction and fermentation. Analysis of samples of gas obtained from the small intestine above a mechanical obstruction indicates that approximately two-thirds of the gas has been swallowed. In large bowel obstruction, ingestion plays a lesser role, much of the gas being of endogenous origin.

The source and nature of the gas seen in the small intestine of normal infants and in that of adults under a variety of circumstances unassociated with intestinal obstruction, is uncertain. The suggestion that it is due to separation of "layering" of gas or air which is normally present but invisible because it is in solution or in an intimate mechanical mixture is untenable, except in so far as it might be applied to diffused or endogenous gas. The solubility of air in the intestinal juices is exceedingly limited and it seems unlikely that the peristaltic action of the proximal small intestine is capable of beating air into a fine froth between two points so little separated as the superior genu of the duodenum where a fluid level is frequently normally seen and the ligament of Treitz where, under comparable anatomic conditions (an inverted turn), no fluid level can be demonstrated. The impression is obtained from fluoroscopic observation that most of the air which enters the esophagus during ingestion of food does not reach the stomach and of that which does, practically all is held there by the "trap" or fluid lock of the duodenum. When a normal person assumes the left lateral recumbent position, the gas rises to the pylorus, the fluid lock is broken and globules of gas enter the small bowel. Magnusson[2] estimated that they traverse the small intestine in from six to fifteen minutes. The failure of this trap mechanism in infants who ordinarily spend much of their time recumbent and who swallow quantities of air, between as well as with meals, better accounts for their small intestinal air content than the assumption of deficient motility with consequent separation of gas. The same explanation is offered for adult aerophagics and probably holds in certain instances of transient small bowel distention associated with pain (biliary, renal colic, ureteral catheterization). The absence of considerable increase in the

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caliber of the small bowel, the division of the visible coils in short isolated segments, usually without fluid levels, and the onward passage of the gas as seen on films made at short intervals, all weigh against a true inhibition of the intestinal motility. It is quite possible that the gaseous content of the bowel in adynamic ileus is also largely ingested but no definite statement concerning this is warranted in the absence of experimental evidence.

Irritants in the form of ingesta or active evacuants are productive of gas and frequently fluid in the intestine, sometimes to a degree which may lead to confusion.[3] The residua of incompletely evacuated enemas may also account for gas and fluid levels in the large, and even in the distal small bowel. Since many patients take cathartics early in the course of abdominal symptoms and almost all with obstipation resort to enemas, queries concerning the agents employed, the time of administration and the effect obtained should be made before a diagnosis is attempted. The possibility that previously administered morphine, which even in single doses affects the intestinal motility and pattern, may be partially responsible for the roentgen findings, must also be weighed. The greatest effect of the drug is on the duodenum[4] which is first contracted and later exhibits prolonged dilatation, while in the ileum closely grouped contracted and dilated zones may produce a pseudo-haustration somewhat resembling the pattern of the colon. Repeted administration causes gas to collect and remain in the small bowel.

The roentgen diagnosis of obstruction depends essentially not on the demonstration of gas and fluid in the bowel, but upon the visualization of distended intestinal loops which are outlined by their gaseous and liquid contents. Furthermore, all speculation concerning the site and nature of the block centers around the relative distribution of distended and collapsed segments.

MECHANICAL OBSTRUCTION OF THE SMALL INTESTINE

The case histories and roentgenograms of 61 patients, who in the last three years entered the hospital with clinical findings suggesting small intestinal obstruction, were reviewed and the pertinent data are displayed in Table I. From them it becomes clear that the ready, accurate diagnosis of mechanical obstruction of the small bowel has three prerequisites:

1. The obstruction must be complete or nearly complete.

2. It must be sufficiently low so that the patient cannot, by vomiting, efficiently evacuate the bowel above the obstruction.

3. Nothing which might interfere with the normal functioning of the bowel below the point of obstruction may be present.

Under ideal circumstances, the classic picture of dilated coils containing fluid and gas above the point of obstruction and empty bowel below it will obtain, and the problem will be reduced to localization of the constriction and to consideration of etiology and mechanical development.

Twenty-four patients (group I) exhibited findings warranting an unqualified diagnosis on immediate scout films. They satisfied the criteria listed above, 23 having a grade of obstruction so complete that palliative measures either were not contemplated or unsuccessfully prosecuted; all were well down in the bowel, one being in the lower jejunum and 23 in the ileum. The peritonitis found in seven cases and the strangulation evident in one did not interfere with the emptying of the distal bowel.

In 14 instances (group II), gas was present below the presumptive obstruction but the discrepancy between the caliber of the proximal and distal loops was sufficient to permit a diagnosis of incomplete obstruction of the small intestine. Neither the incidence nor the grade of peritonitis in this group suggests that a superimposed paralytic ileus on this basis was an important factor. The films of these patients offer visual confirmation of the clinical observation that constipation is not a constant sign in mechanical obstruction of the small intestine nor essential to the diagnosis.[5] However, it is impossible to be certain in how many cases the constriction was partial, permitting passage of limited quantities of

gas, and in what number a secondary inhibition of the distal bowel, of unknown etiology but possibly associated with the duration of symptoms, was responsible for the presence of gas below the obstruction.

When the initial findings were inconclusive (group III), it sometimes was possible by serial studies at short intervals (two to four hours) to observe the completion of the obstruction and thereby to arrive at a definite diagnosis. The infrequent use of this method in the present series is attributed in part to the long duration of symptoms before admission, in part to prompt surgery in the group classified as "incomplete" and in some measure to the increasing use of intubation and suction. It must be borne in mind that even after introduction of the Miller-Abbott tube and the establishment of an apparently adequate flow, further examination is required to make certain that the tube advances without hindrance and that the bowel is being properly deflated.

Two lesions situated in the duodenum and one in the proximal jejunum (group IV) were not evident on plain roentgenograms of the abdomen. The jejunal obstruction became overt on repeated observations but those in the duodenum required the use of contrast material. The oral administration of barium sulphate should be restricted to those patients in whom no obstruction can otherwise be demonstrated and to those whose distended gut has been adequately deflated by the Miller-Abbott tube. If these precautions are observed the danger of completing the obstruction will be minimized.

Group V, in which no positive roentgen diagnosis was reached, either because there was no considerable gaseous distention of the bowel or because the distribution of gas was uniform throughout the intestinal tract, was made up for the most part of patients who were not very ill. A number were treated medically with favorable results and of those who came to surgery, several were operated more on the basis of history than of immediate necessity. Unquestionably, the optimum time for the demonstration of the obstruction had passed and its site could be determined only by awaiting a recurrence or possibly by careful study of the contrast-filled small intestine. It might be permissible to dismiss the group as clinically insignificant except for the inclusion of three cases of strangulation obstruction. The absence of characteristic roentgen findings in some cases of obstruction with strangulation (three of six in the present series) is disconcerting. Similar difficulties in diagnosis have been encountered by others.[6, 7] There twice occurred, however, a phenomenon which is presented as a valuable, if inconstant, sign. In both instances the strangulation developed as a result of volvulus of the terminal ileum secondary to adhesions, in the right lower quadrant. The soggy, blood filled coils, suspended from their axis of torsion, sank in the pelvis as a palpable tender mass. The air-containing bowel lying above the mass delineated its superior margin on the film. While degenerated or inflamed primary pelvic tumor with associated ileus might first be suspected, roentgen findings of this description coincident with clinical manifestations of obstruction warrant immediate surgical intervention. In simple mesenteric thrombosis, although the affected loops may be heavy enough to sink into the pelvis, they are not unified by axial rotation and appear as a formless pelvic density. The appearance of intestinal distention in these cases is frequently so delayed as to be of little diagnostic value.[8] It may fairly be stated that whenever there is any suspicion of obstruction with strangulation, negative roentgenograms should not be given much weight and positive findings accepted as a stroke of good fortune and not a sine qua non.

THE TIME ELEMENT IN THE DIAGNOSIS OF OBSTRUCTION

When obstruction of the small bowel occurs, proximal dilatation is gradual, the amount of gaseous distention depending among other factors on the elapsed time. While animal experiments indicate that ileus may be demonstrated within three hours of the production of a simple ob-

struction and as early as one hour after a strangulated obstruction,[9] it must be borne in mind that these conclusions are valid only under the conditions of the experiment and not susceptible to unqualified translation into clinical practice. It may be possible to discover roentgen evidence of ileus within a very short interval after the onset of symptoms, the early findings frequently being corroborative rather than characteristic. However, few patients are seen so soon and not all of these have a block which satisfies the fundamental criteria for diagnosis on scout roentgenograms. A partial obstruction may not become complete for many hours or even several days. The experiments concerned with strangulation obstruction have no close clinical parallel. The divergence is ascribed, by Hibbard et al.,[10] to differences in the effects of arterial and venous occlusion. Its practical significance, as indicated in the preceding paragraph, is considerable.

LOCALIZATION OF THE OBSTRUCTION IN THE SMALL INTESTINE

The obstructing lesion is situated at the point of transition of distended and collapsed intestine. The first step in localization lies in demonstrating that the prestenotic loop is in the small and not the large intestine. The two parts of the bowel are differentiated by their position, the thickness of their walls and the appearance of the permanent internal markings (connivent valves and haustra). As a rule, the large bowel follows the periphery of the abdominal cavity in the form of an inverted U and is fairly constant in position. However, variations are not infrequent, the most common resulting from faulty rotation with all the colon in the left half of the abdomen or the cecum in a subhepatic position, and from incomplete attachment of the mesentery, permitting abnormal mobility of the sigmoid or ascending colon. The small intestine which is usually centrally situated with the long axis of its coils transverse superiorly and oblique below may become so distended as to fill the abdomen and apparently reach its periphery. Thus it may be difficult to determine from position alone whether a distended loop is colon or small intestine.

The wall of the large bowel is normally thick, that of the small intestine thin. However, the one may be attenuated by distention, the other widened by hypertrophy in chronic obstruction and fluid or exudate in acute processes.

In like fashion the completely encircling Kerkring's folds of the jejunum, the smooth tubulization of the ileum and the thick, centrally deficient colonic haustra, which ordinarily permit of ready differentiation, may become indistinguishable. The direction and length of the fluid levels and a V-indentation of the outer wall of the large bowel which have also been used as diagnostic leads, may be inconclusive. If there is any doubt either because the distention is insufficient to bring out the anatomic characteristics of the unaffected segment or so great that they are effaced, a barium enema offers a certain, harmless solution.

The intestinal pattern is best seen on films made with the patient supine, while fluid levels are most satisfactorily demonstrated in postero-anterior projections made with the patient erect and in the right or left lateral recumbent positions.

The more precise localization of small intestinal obstruction depends upon the apparent position of the lowermost distended loop, the internal architecture of this loop and if possible its assignation to one of the primary anatomic groups.[11] Since accurate localization is a desideratum in planning a surgical approach, a critical evaluation of these basic factors is warranted. The relation of the distal visibly distended loop and the stenosis depend on how completely the patient has evacuated the proximal bowel by emesis and how much gas has entered. This process is in a large measure a function of the duration of the disease and the development of secondary adynamic ileus in the upper small intestine. It may be possible in early cases to facilitate the exchange of gas and fluid by placing the patient on his side. Postero-anterior films made in the right and left lateral recumbent position, particularly if these have

been maintained for a short time, may allow the escape of fluid from the distal prestenotic bowel and its partial replacement by gas. If some measure of this type is not employed it will be impossible from the usual supine and upright roentgenograms to determine whether there lies just below the lowest visible coil, the obstructing lesion or several feet of dilated bowel which contain fluid but no gas. In complete obstruction of longer duration where the fluid-gas interchange has been adequate, the position of the distal distended loop may be depended on to indicate the segment of bowel that is involved. If the distended loops all lie in the upper abdomen, it may be assumed that the jejunum is obstructed, if in the lower the ileum. The presence and height of the connivent valves which are clearly defined in the jejunum and less well formed distally, and identification of the primary anatomic group by the position and direction of the loops are more refined methods of arriving at the same conclusion. The enthusiasm for exact intra-enteric localization should be tempered by the realization that almost all obstructions of the small intestine are of extrinsic origin and that what is required is not the relative length of the proximal segment but the situation of the causative agent (band, or internal hernia).

This cannot accurately be predicted because the distended bowel depends on a relatively small mesenteric axis and is capable both of accordion-like expansion and rotary displacement of uncertain degree. It is possible for distended loops above a low jejunal or proximal ileal obstruction (fig. 1) to fill the abdomen in typical staircase fashion with the distal loop and assumed point of block deep in the pelvis. Similarly, all the small bowel may be so rotated in an internal hernia that the terminal ileum which is obstructed at its point of egress from the sac lies not in the right lower quadrant as might be expected from the plain films, but near the root of the mesentery (fig. 1A). Practically, these displacements, since they cannot be de-

Fig. 1. Mechanical obstruction of proximal ileum due to postoperative adhesions. Distended, horizontally directed coils fill entire abdomen with lowest distended loop deep in the pelvis.

Figure 1A. Para-duodenal hernia with incarceration of a small loop of distal ileum.

tected except under certain conditions to be discussed later, are ignored.

MECHANICAL OBSTRUCTION OF THE COLON

Symptoms supervene as a rule only when obstruction of the large bowel is nearly complete. Because of this, the physical conditions for immediate unqualified diagnosis are present when the patient is first seen. Localization also is comparatively simple but should always be confirmed by a contrast enema which not only more accurately establishes the point of stenosis, but may add valuable information concerning its etiology. The patients may be divided into two major classes, those in whom the proximal distention is confined to the large bowel and those who exhibit dilatation of both the large and small intestine. There is some difference of opinion concerning the relative roles that ileal stasis, peritonitis and actual regurgitation through an incompetent type of ileo-cecal valve, play in the development of the secondary small bowel distention.[12] However, Wangensteen's position that regurgitation is rare, probably is untenable. The only real reason for the formation of the two classes is the assumption that the first represents a pure closed loop obstruction, the second a less lethal open loop type. A much more valuable indicator of the adequacy of the mechanism for spontaneous decompression is the degree of proximal distention. Whenever in distal obstructions there is a considerable increase in the diameter of the cecum, the danger of necrosis of the bowel wall is great and whatever measures are considered should be carried out without regard to the presence or absence of fluid and gas in the small intestine.

The small bowel dilatation although usually much less than that of the colon, may so predominate when the lesion is in the cecum or proximal ascending that a mistaken diagnosis of small bowel obstruction will result.

ADYNAMIC ILEUS

When a diffuse gaseous distention of the intestinal tract is present, and low mechanical obstruction is ruled out by visualization of a gas-filled rectum or by a barium enema, the only possible roentgen diagnosis is adynamic ileus. No etiologic diagnosis can be made and there is no way to determine whether the circulation of the dilated bowel is cut off by mesenteric thrombosis or whether it is relatively normal. Separation of the distended loops, attributed either to thickening of their walls or intervening fluid, and unsharpness of the properitoneal fat line suggest peritonitis or ascites but must be correlated with clinical findings in order to arrive at dependable conclusions. It is possible that the apparent distance between adjacent coils may be increased by fluid within the lumen of the gut as well as between the coils and that this accounts for some of the discrepancies between the roentgen and anatomic findings.

When the inhibition affects only, or is largely restricted to, the small bowel and the colon is contracted or normal in caliber, the differentiation from mechanical obstruction is practically impossible. This type of dissociated distention is most apt to develop within a few days after abdominal surgery and, if it cannot be controlled by intubation, will require ileostomy. It is likely that the usual post-operative ileus is in these cases associated with fibrinous adhesions. Neither factor in itself could produce the symptoms, but the combination of the two results in a residual distention of the small intestine after the colon has regained its tone.

A mixed form of paralytic and mechanical ileus such as is produced by diverticulitis and intraperitoneal abscess particularly of appendiceal origin, may closely simulate strangulation obstruction.[13] The direct roentgen findings are of no differential value, but where the possibility of diverticulitis is raised, a barium enema will offer positive information.

DIFFERENTIAL DIAGNOSIS OF SMALL BOWEL OBSTRUCTION

Study of the present series from an etiologic standpoint and consideration of the possibilities for differential diagnosis in acute obstruction furnish little that is novel. Statistical analysis is impossible because of the deletion of all external hernias

and of those cases with mechanical and adynamic ileus who either had no roentgen studies or were listed in the hospital records only under a primary diagnosis.

Of the small bowel obstruction, 27 were due to postoperative adhesions, almost all in the pelvis or right lower quadrant. Where there has been previous surgery, the scar may furnish a more accurate index of the position of the obstruction than does the roentgenogram. This is particularly true in early obstruction where adequate fluid-gas interchange has not occurred. However, when the symptoms are of longer duration, the roentgen localization of the distal distended loop to a point well above the incision suggests either that multiple adhesions are present or that the obstruction is of other etiology. The mechanical ileus produced by adhesions of whatever origin is of a conventional type with no distinguishing characteristics.

When a coil of small bowel rotates about a band of adhesions or when a volvulus of other origin is present, the appearance of the coil in question and of the bowel above and below it will be conditioned largely by the degree of interference with circulation. If this is minimal, the differentiation from simple obstruction may be possible by the recognition of an arcade rather than horizontal arrangement (fig. 2) of the distended loops and occasionally by the demonstration of an isolated group of distended coils (fig. 3) both the proximal and distal bowel being collapsed. With strangulation and the early development of peritonitis and inhibition ileus, there arise the difficulties which were mentioned in a preceding paragraph (fig. 4).

The recognition and classification of internal hernias are much simpler when the bowel is not acutely obstructed and contrast studies can be made. When this is impossible, the diagnosis, if feasible, is only inferential. It will depend on the relation of the hernial orifice to the mesenteric root, the length of the incarcerated segment and whether the afferent or efferent loop is constricted. When the orifice is at some distance from the attachment of the mesen-

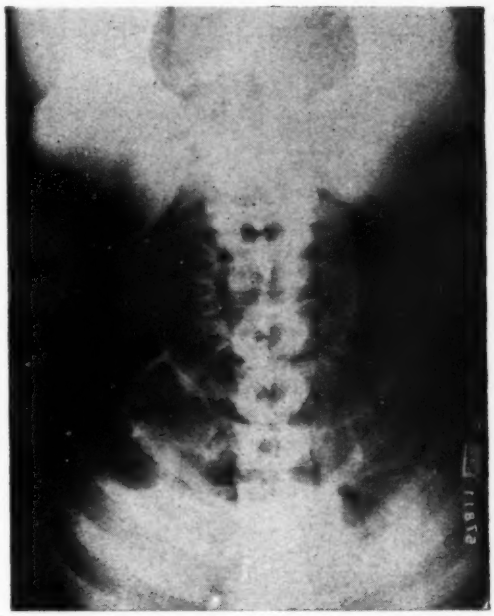

Figure 2. Volvulus of small bowel about a band of adhesions. Arcade formation. Circulation little improved.

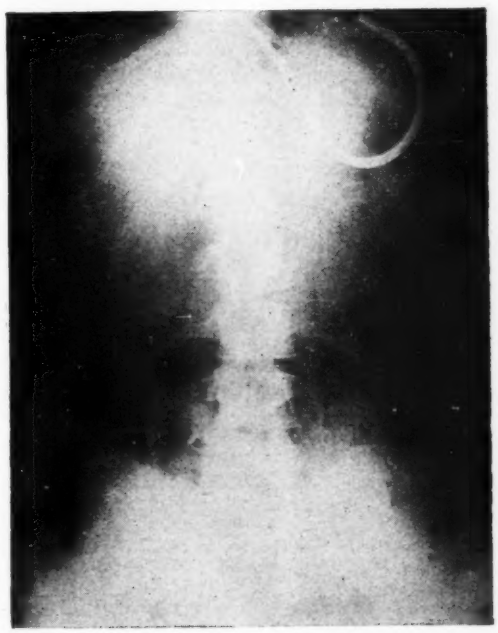

Figure 3. Volvulus of a short loop of distal small intestine about a band of postoperative adhesions. Circulation little improved. Isolated, distended loop.

Figure 4. Volvulus of a short loop of ileum about a band of postoperative adhesions. Strangulation with resultant gangrene. Blood filled loop forms visible mass. (Retouched).

Figure 5. Group of coils in sac of para-duodenal hernia obstructed at point of egress from sac. Arcade formation attributed to associated volvulus.

tery and the capacity of the sac is small, the drag on the distended proximal loops draws them into an oblique or vertical pattern which differs from the horizontal course in simple obstruction and the arciform grouping of volvulus. This situation is best illustrated in pelvic hernias either of congenital or acquired origin (fig. 5) (one congenital prevesical hernia and one hernia through a rent in the broad ligament following a Baldy Webster suspension are listed in the present series). When the orifice of the hernial sac is close to the mesenteric root, no distraction of this kind can be expected. If the afferent loop is obstructed, a condition impossible in the more frequent left paraduodenal hernia,[14] the findings will resemble those of any other high obstruction. If the obstruction is at the point of egress, the bowel within the sac will conform to its position and dimensions and this limitation (fig. 5), uninfluenced by alteration in posture, may be diagnostic.

Foreign bodies usually obstruct the lower small bowel. A more exact diagnosis can be made only if the foreign body is sufficiently dense to be directly demonstrated, or as sometimes occurs in gall stone ileus, air entering the liver through the fistulous tract, visualizes the biliary radicles.[15]

Obstruction of the small intestine resulting from congenital anomalies, if complete, is characterized by absence of gas in the distal bowel. Since, after the first 24 hours of life, the normal infant's intestine is uniformly distended, the absence of gas is pathognomonic. If the obstruction is high, no further study is necessary, if low, a barium enema should be administered to determine the patency and course of the colon and, if possible, to fill the distal small intestine. It is only by this method that a diagnosis of malrotation of the colon and volvulus of the mid-gut can be made. Incomplete obstruction in infancy is judged by the usual criteria, including the barium meal, if marked distention visible on plain roentgenograms does not contraindicate the procedure. No distinction between intrinsic and extrinsic block or between single and multiple points of stenosis is possible.

Primary tumors of the small bowel to produce obstruction must be quite large, annular neoplasms giving rise to more complete stenosis than polypoid masses. The obstruction is likely to be subacute or chronic, and the diagnosis is usually made by serial examination of the contrast-filled intestine.

DIFFERENTIAL DIAGNOSIS OF LARGE BOWEL OBSTRUCTIONS

Primary carcinoma of the colon and diverticulitis are, considering their high incidence, relatively infrequent causes of acute obstruction. The findings on scout films are not specific and a barium enema is necessary to determine the exact level and the nature of the etiologic agent. Secondarily infected neoplasms may present a diagnostic problem which can be solved only by surgery or by re-examination after subsidence of the acute symptoms. Metastatic carcinoma of intestinal or extra-intestinal origin may produce obstruction by direct invasion of the bowel simulating primary neoplasm, or by the implantation of multiple nodules in the serosa of the intestine with final development of both mechanical and adynamic types of ileus.

Although cysts of endogenous and mesenteric origin may produce mechanical obstruction, benign cysts and tumors of other etiology do not interfere with the progress of the intestinal contents unless they impinge a relatively fixed segment of bowel against a bony prominence. This occurred once in our series, the distal sigmoid being pinched between the large fundus of a previously "suspended" uterus and the pelvic brim. Any similarly situated mass including a pregnant uterus[16] might exert the same force. It is important to remember that these obstructions which may be recognizable roentgenologically can, on occasion, be released by placing the patient in the knee chest position and permitting the pelvic mass to fall forward.

Intussusception, whether idiopathic, as in infants, or resulting from a mechanical abnormality in adults, cannot routinely be diagnosed from plain roentgenograms which only reveal obstruction of varying grade. It is occasionally possible to identify the intussusception by observing apparent reduplication of the walls of the bowel which ensheath it. Since most intussusceptions involve the colon, the diagnosis is best made by means of a barium enema. It is important in infancy that this method and not oral administration be employed so that no time is wasted. However, where the process is confined to the small bowel, no exact roentgen diagnosis is possible. Complete reduction of the intussusception by the diagnostic enema occurs rarely. This in no way contravenes the spectacular results of Hipsley,[17] the differences being in the greater length of time pressure is maintained, and in the induction of anaesthesia before the enema is given.

The only segments of the large bowel which are sufficiently mobile to be susceptible to obstruction by volvulus, are the cecum and the sigmoid. The torsion results in isolation and displacement of a short tremendously distended loop which contains a large quantity of fluid. Thus the sigmoid is rotated to the right and the twisted cecum may lie in the mid-abdomen. Moderate dilatation of the proximal bowel often develops. The diagnosis rests on the recognition that two points of obstruction, one above and one below the markedly distended coil, are present. Supplementary barium enema examination may confirm the findings of the scout film and visualize the actual torsion of the bowel.[18]

It is commonly assumed that in cases of imperforate anus or atresia of the distal colon, the thickness of the septum can be measured by the interval between a marker deep in the anal dimple and the upper limit of the gas column, the film being made with the infant inverted.[13] It is almost certainly true that when no shadow identifiable as that of the rectum is seen, an atresia exists. However, when the proximal rectum is distended with gas, it is impossible to estimate the thickness of the occluding septum. The usual measurement is invalid because there is interposed between the skin marker and the upper limit of the gas column not only a septum, but also a layer of meconium of in-

TABLE I

MECHANICAL OBSTRUCTION OF THE INTESTINE

	CAUSE									DURATION (DAYS)						CLIN. DIAG.		TYPE		SITE			OPERATION									
	No. of Cases	Adhesions	Foreign Body	Intern. Hernia	Neoplasm	Cong. Anomalus	Adh. and Volvulus	Intussusception	Mesent. Thromb.	?	1	2	3	4	Over 4	Mech. Obstr.	?	Simple	Strang.	Duo.	Jej.	Ileum	Immed.	6 Hrs.	12 Hrs.	24 Hrs.	More	Peritonitis	Free Fluid	Properitoneal Fat Line Disturbed	Thick Bowel Wall	Medical Management
*Group I—	24	13	2	2	1	2	3	1	1	3	10	4	5	2	3	21	3	23	1	....	1	22	14	....	1	2	6	7	9	5	5	1
*Group II	14	6	....	1	1	2	2	....	....	2	5	....	1	1	7	10	3	12	2	....	4	10	7	....	....	1	4	3	2	1	2	....
*Group III	3	3	....	....	....	....	....	....	....	....	2	....	....	....	1	3	....	3	0	....	1	2	1	....	....	1	1	....	....	....	1	1
*Group IV	4	1	....	....	1	1	1	....	....	....	....	1	....	....	3	3	1	4	0	3	1	....	2	....	....	1	1	....	....	....	....	....
*Group V																																
(a).....	3	2	....	....	....	....	1	....	....	....	1	....	....	....	2	2	1	2	1	.... unknown	....	2 1	....	....	....	1	1	1	1	....	....	1
(b).....	13	2	....	1	....	1	Volv.	....	....	1	5	1	....		6	10	3	11	2	.... unknown	....	6 5	....	....	2	....	3	2	1	2	3	5

*Group I: Typical findings of complete obstruction on first film. Group II: Obstruction incomplete but sufficient for diagnosis. Group III: Serial study necessary for diagnosis. Group IV: Site of obstruction too high for visualization on flat films. Group V: Degree of obstruction insufficient for definite diagnosis; (a) No distention of small or large bowel; (b) Uniform distention of small and large bowel.

determinate thickness. In the single case of imperforate anus in this series, a spontaneous perforation 24 hours after birth made it quite clear that only the anal membrane was imperforate and that meconium accounted for the remainder of a homogeneously dense shadow which measured 2 cm. in width (fig. 6).

Obstruction of the colon by accumulation of its contents is not uncommon. It is rarely present at birth (meconium ileus). The diagnosis was suggested in a newborn infant whose scout films revealed small bowel distention. An attempted barium enema failed to outline the usual pencil thin postatretic gut but was obstructed by meconium in a rectum of normal size.

Fecal obstruction is usually due to congenital megacolon and the acute symptoms may result from the mass of the bowel content or from a superimposed volvulus. The diagnosis is often clear from the plain film, the distended colon being packed with feces, but should be confirmed by an enema to rule out any possibility of mechanical obstruction. Films made after attempted evacuation demonstrate the contractility of the dilated bowel. Occasionally, the stercoraceous mass forms a psuedo tumor which is readily distinguished from a true neoplasm. There develops in late adult life an acquired megacolon, the bowel being markedly redundant and its diameter considerably increased. These patients enter the hospital with obstipation and sometimes with symptoms suggesting obstruction. The diagnosis is not difficult.

CONCLUSIONS

1. There is a high index of correlation between the roentgen and clinical findings in intestinal obstruction.

2. Whenever the suspicion of strangulation obstruction arises, surgical intervention should not be delayed because of negative roentgen findings.

3. The recognition of the part of the small intestine which is obstructed does not necessarily localize the lesion which produces the obstruction.

4. It may be possible from the arrangement of the distended loops to make certain assumptions regarding the mechanism of the obstruction.

5. Distention of the proximal colon when the distal large bowel is obstructed is of greater prognostic significance than the presence or absence of gas and fluid in the small bowel.

6. Postoperative adynamic ileus, when it affects chiefly the small bowel, cannot be differentiated from mechanical obstruction.

7. The commonly accepted method of measuring the septum in cases of imperforate anus is invalid.

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Figure 6. Membranous imperforation of anus. Width of apparent septum due largely to meconium.

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DISCUSSION

Dr. Urban Maes (New Orleans): It is going to be rather difficult to go into a detailed discussion of the various types of intestinal obstruction that Dr. Teitelbaum has brought to our attention. However, I think that we should credit the radiologist with the fact that he has attempted to aid us in differential diagnosis as to the cause of the obstruction. I think that Dr. Teitelbaum's separation of these cases into complete and incomplete types, and the attempt at localization are a valuable help. Localization may help us decide where to place the incision, which is very often an embarrassing problem in obscure types of intestinal obstruction. The difficulty is that x-ray does not always tell us where the obstruction is but only that there is obstruction, and I think this represents the attitude toward the interpretation of the cause and localization of gas and fluid levels. Beyond this and without the use of an opaque medium, I do not know that the radiologist can offer us anything more.

Dr. Teitelbaum has very properly said that many instances of high obstruction are fatal. The mortality of acute intestinal obstruction is still too high, around 50 to 60 per cent, and we are anxious to cut this mortality down through early diagnosis. We depend upon the radiologist for considerable help but I believe it is questionable whether the radiologist can always make a positive diagnosis for us.

We note in a recent report that Dr. Allen Whipple intubates first with the Miller-Abbott tube; his mortality rate is lower than anybody else's because he starts with the idea that there is going to be obstruction and passes the Miller-Abbott tube before the cessation of peristalsis. That has a dual advantage. It may decompress sufficiently to prevent obstruction becoming complete, or if obstruction has occurred it may help the radiologist in localization if the tube has gone through the pylorus. On the other hand, we cannot place too much dependence on the use of the tube, on account of the danger of rupture. In our own series we have had nine cases in which rupture of the intestine occurred at the site of obstruction when the Miller-Abbott tube had been used. In each of these cases, the bowel was decompressed and there were no gas or fluid levels, but only some local distention.

I think that specifying the diagnosis as Dr. Teitelbaum has done is going to be of very great help, and these two cases of volvulus of the small intestine seem to be particularly instructive.

I want to emphasize one point concerning adynamic ileus particularly, and also with reference to mesenteric thrombosis. Dr. Teitelbaum is able to make suggestions but all the surgeon gets out of the x-ray picture is information about the gas and fluid levels. The radiologist does help us with diagnosis and may give considerable information in the way of localization. But I believe I am right in quoting Dr. Teitelbaum as saying that in adynamic ileus it is often not possible to make a positive diagnosis without the use of barium along with x-ray localization. However, the essayist has called attention to the fact that we should not use this procedure unless there are very special indications, and that he cannot always give exact information without it.

Dr. David I. Hirsch (Monroe): Intestinal obstruction has been one of my hobbies and I think that the present classification used today was first published by me in the New Orleans Medical and Surgical Journal in 1927. The value of the x-ray in the diagnosis of intestinal obstruction should not be under-estimated. The difficulty presented by obstructions in some cases is marked, and the x-ray tells us much, and in most instances is able to confirm the diagnosis. The combination of the x-ray with careful observation, is sufficient for a positive diagnosis in most instances. The symptoms of obstruction vary with the pathology at the time of observation. It may vary from colicky pains to exhaustion and prostration. To forego the x-ray when it is available is not advisable, for a positive x-ray diagnosis of obstruction, when the symptoms are not typical is a sufficient indication for operation. Occasionally an error is made, but the number of times in which the x-ray evidence is correct would offset the discrepancy.

Dr. M. D. Teitelbaum (in closing): As Dr. Maes suggests, it is important to introduce the Miller-Abbott tube early. If one waits any considerable interval and distention occurs, the loops of dilated bowel will push the stomach up to a horizontal position and repeated attempts at intubation may be unsuccessful.

SYMPOSIUM ON MILITARY MEDICINE*

THE MEDICAL PROFESSION AND SELECTIVE SERVICE IN LOUISIANA

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NEW ORLEANS

The Medical Division of the Selective Service System in Louisiana has been charged with the responsibility of choosing, by means of rigid physical examination, those among the manpower of the State who are mentally and physically fit for military duty. How well this responsibility has been discharged is attested to by the fact that Louisiana ranks among the highest of any State in the nation from the standpoint of service, economy, and results obtained.

For a month previous to the date of the historic peacetime registration for military duty, the Medical Division along with the other divisions of the Selective Service System, was undergoing organization. With the able assistance of Dr. Musser, a local physician was appointed as examining physician for each local board. At about the same time, nine medical advisory boards composed of specialists were organized over the State to complete whatever special examinations might be required. Three of these boards are located in New Orleans, one each in Baton Rouge, Lafayette, Lake Charles, Alexandria, Monroe and Shreveport. In November, when physical examinations were begun, the Medical Division was ready.

At this time there are 417 examining physicians, 27 dentists and 88 medical advisory board members in Louisiana giving of their time and knowledge to the cause of national defense without remuneration other than consciousness of work well done. These men, together with those composing the local boards, are the backbone of the entire organization and, in my humble opinion, future events will demonstrate beyond doubt the great importance of this voluntary work at the very first sign of danger to our country.

As of September 15, 1941, the Medical Division has physically examined 66,279 registrants. Of this number 41,090, or 62 per cent have been found physically and mentally qualified for general military duty. However, as a result of Amendment No. 50, placed into execution May 5, 1941, prescribing minimum educational requirements for general military duty, the number thus qualified was reduced to 23,565, or approximately 35 per cent of the total number examined; 12,927, or 19.5 per cent have been found qualified for limited military service and 29,787 have been placed in Class IV-F or unfit for military service. Of this latter number, approximately 16,441, or 25 per cent of the total have been placed in Class IV-F by reason of illiteracy and the remaining 13,346, or 20 per cent of the total, have been placed in Class IV-F by reason of mental, physical or moral defects.

As of October 1, 1941, 18,074 selectees have been delivered to the Army Induction Stations by Louisiana local boards; 1,792, or 9.9 per cent have been rejected at the induction stations for mental, physical or other reasons. This compares favorably with the current rejection rate of about 14 per cent for the entire nation.

The local boards and examining physicians have been kept thoroughly posted as to the results of their labors by monthly tabulations of acceptances and rejections at the Induction Station. Also, they have been kept currently posted on the number and causes for rejection as applied to their particular group. This has been conducive to a healthy competitive spirit which has undoubtedly contributed to the satisfactory results obtained.

The procedure of conducting these physical examinations is now in the process of drastic revision throughout the country. The chief purpose of this change is to give registrants 30 to 40 days' notice that they are or are not physically qualified for induction, thus permitting them to arrange their personal affairs prior to induction.

*Read before the Orleans Parish Medical Society, November 10, 1941.

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The secondary consideration is to relieve the local board examining physicians and dentists of much of the drudgery and paper work required by the present system by requiring only that they make an inspection of all registrants for the purpose of ascertaining any manifestly disqualifying mental or physical defects.

The Louisiana State Board of Health and the United States Public Health Service have completed 57,012 serologic blood tests and many thousands of urinalyses and promptly reported the results to the local boards. Of these serologic blood tests performed, 49,488 have proved negative and 5,684, or 9.9 per cent positive. There were 1,840 doubtful reactors. Of the positive cases, 435 have been under treatment for a period of at least two months and many others for a shorter period of time. The Public Health Service is making strenuous efforts to contact all of the positive reactors to make certain that they undertake curative treatment.

Thus it has been found that only about 35 per cent of our young men are qualified for general military duty from a physical, mental and literate standpoint; 20 per cent have been found not physically fit but with defects that are remediable; 10 per cent have been found unfit by reason of syphilis alone; 25 per cent are found wanting in educational qualifications equal to a fourth grade education and 20 per cent have more or less irremediable defects, physical, mental or moral.

While this department has done everything possible to assist in the rehabilitation of these individuals our efforts and facilities have been insufficient. Fortunately, the President has decreed that all those with remedial defects must be rehabilitated and in my opinion, if this is followed through to a successful conclusion, it may well be worth a large part of the cost of the operation of the Selective Service System. This plan, under the supervision of the Selective Service System, calls for the rehabilitation of rejected men between the ages of 21 and 28 found by the Army to have remedial defects and who, as a result of such treatment, will be made available for general military duty. The remedy will be provided by physicians and dentists of the locality in which the registrant resides and compensation will be paid from general funds to be made available for such purposes. This still leaves a large number of registrants with remedial conditions who should receive care and treatment from other sources. Some, of course, are able to have their own defects corrected, but a great majority will require assistance of the medical and dental professions and State institutions. It would seem to me that here is a field of work in which the medical and dental professions should take a leading part rather than lay organizations. I would like to leave this proposition with you for any consideration you may care to give it.

Complaints have been voiced that the physical standards set up by the Army are too rigid; that just because a registrant has a queer personality but is able to do hard work, he should not be rejected; that the rundown individual and one needing discipline would be helped by Army service, and the malingerer and other unstable people should be made to serve. On the surface this may appear to be the correct attitude. However, in evaluating the problem the following facts must be kept in mind: "Modern warfare differs from the past in two main characteristics: First, it is "total war" and involves the whole population. Adequate production of food and war materials, maintenance of morale in the face of attack on the civilian population and preservation of faith in our destiny require the active cooperation of the whole community. Second, modern warfare is mechanized, demanding a degree of intelligence, individual responsibility and the emotional balance never before conceived of in an Army. The Army now to be raised is a peacetime Army for the purpose of training. From it, in case of war emergency, will come the leaders of the defense forces."

For this reason it is necessary to exercise caution in the selection of men, and em-

phasis must be laid not only on physical fitness, but also on intellectual capacity and emotional soundness, that is, on ability to learn and on capacity for responsibility.

It is not sufficient merely to keep men with obvious symptoms of such conditions as epilepsy, feeblemindedness, dementia preacox and hysteria out of the Army. Chronic trouble-makers and delinquents, inveterate bums and complainers and alcoholics, who in times past were pressed into Army service in order to rid the community of them, have no place in the modern Army. They destroy the morale of their units and after the expensive training has been wasted on them, they have to be left behind, wards of the Government and a cost to the taxpayers.

I wish to take this opportunity to express my appreciation to the medical and dental professions of Louisiana for the many courtesies extended, both on my behalf and on that of the Selective Service System.

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DENTAL DEFICIENCIES AND REHABILITATION OF SELECTEES

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It is a pleasure to take part in this symposium and present to the members and guests of the Orleans Parish Medical Society the dental aspects of the Selective Service situation as of this date.

This subject covers a broad field and involves a consideration of the dental deficiencies of the selectee, a pre-habilitation program to remedy such defects before he presents to his local draft board for examination, and a rehabilitation program for the registrant who has been rejected by his board because of dental deficiencies.

The time allotted to me will not permit of a complete and detailed treatment of all phases of the subject so I shall confine my discussion to only the most salient and pertinent thoughts on the subject.

The Selective Service examinations have attracted the attention of our nation to the great number of dental cripples in our young American manhood. Report after report from Selective Service Headquarters and from other official sources tells the same story,—dental disease is the largest single cause for physical rejection. The latest reports show that approximately 20 per cent of the young men rejected for military service under the Selective Service Act are physically unfit because of dental reasons.

This unusually high percentage of rejections because of dental disease has served as nothing ever before to arouse and focus the attention of this nation on dental health. Even in normal times dental health is a necessary factor in the achievement of general health for both the individual and the community. But now in our present emergency, dental health is of even greater necessity, because of the important role it plays in developing the manpower necessary for national defense.

The dental angle of the Selective Service situation has received wide publicity and the astounding news that out of the Army's first 400,000 physical rejections, 75,000 were disqualified because of dental deficiencies came as a shock to the people of this country. This state of affairs was so apparently the result of neglect that the public wanted to know why it was not prevented.

They say this widespread condition of dental disorder should have been recognized in its beginning and that preventive measures should have been instituted long before the condition reached this advanced stage.

As a matter of fact, this condition was noted in its beginning and this high percentage of dental cripples reported by the Selective Service System was by no means a surprise to the organized dental profession. We knew quite well that a large per cent of the people of this country were not receiving adequate dental care in spite of the many existing facilities for the purpose, both private and public, and we knew that

the results of accumulation and neglect would eventually exact their full toll; and, incidentally, not only from this particular age group of young men but from the nation's population as a whole.

The dental profession pointed out to the public, the evidence of ever increasing dental neglect among the young of our country and emphasized the necessity of early dental care, if the harmful results therefrom were to be avoided. We developed and inaugurated dental health educational and dental care programs and employed every other conceivable and practical means available to develop a greater appreciation for dental prevention and dental care, and to raise the general level of public dental health. The fact that this nation-wide condition of dental neglect exists today is due largely to a lack of public support. It is due to the public's failure to visit the dental office.

Dentistry does not claim ability to develop full immunity to dental caries and other dental disease, but it is able to prevent tooth loss as a result of dental disease in a majority of instances when it is given the opportunity before the condition is too far advanced.

In certain sections of the country, as for instance, our coastal parishes, the dental rejections run nearer 40 per cent than the figure previously mentioned. Dietary deficiencies unquestionably play a part in the etiology of these cases, and while early dental care might not entirely prevent their occurring it could prevent and eliminate infection and would certainly prevent much tooth loss.

It is estimated that only about 22 per cent of our nation's population is receiving dental care today. Dental science has made great advances in all of its branches during the past 25 years, and why more people have not availed themselves of what it has offered during these years in prevention and correction is difficult to understand.

Economics, without doubt, figures as one of the reasons for this. It is not the predominant reason, however, as some seem to think, because from general public knowledge, we know that a fair percentage of those rejected for dental defects were financially able to secure adequate dental care. Numerous other reasons serve to keep people from the dental office, such as, fear of pain, procrastination, lack of time, and ignorance of the results of dental disease.

In a recent survey conducted by the United States Public Health Service in Hagerstown, Maryland, it was accurately shown that the teeth of children under fourteen are decaying much faster than they are being treated. It is a generally accepted fact with the dental health workers of the country, that today well over one-half of our school children are not receiving dental care. It is impossible to determine the amount of adult dental deficiency this may eventually cause, but it is quite evident that the amount will be tremendous if nothing is done to correct the situation at its source, that is, during childhood.

Our dental health problem begins with the teeth of the young children and this is the point where our efforts should be directed, if we hope to build sound and healthy bodies for our nation's population.

The minimum dental requirements set up by the Selective Service Act are far from being prohibitive. As a matter of fact, they are rather low. Briefly they are as follows: Twelve serviceable natural teeth in occlusion, that is, three serviceable natural incisors above and three below opposing, and three serviceable natural masticating teeth above and three below opposing. The term "masticating teeth" is understood to include biscupids and molars and the term "incisors" includes incisors and cuspids.

A tooth is not to be considered a serviceable tooth when it has caries involving the pulp; when its root apex is infected; or when it has an excessively deep pyorrhea pocket which is beyond correction. A tooth which is carious but which can be restored to normal function by filling or crowning is considered a serviceable natural tooth. A tooth which has been restored by a pon-

tic or a dummy attached to a bridge, either removable or fixed, is considered a serviceable natural tooth, when the history and clinical appearance of the abutment teeth and the bridge are such as clearly to warrant such an assumption. This covers briefly the minimum dental requirements of the selectee. These are the dental standards such a large percentage of our nation's potential manpower failed to meet.

A fair percentage of the registrants rejected for dental defects can have such defects remedied at a reasonable cost of time and money. Our immediate problem is to salvage what we can of this great number of rejections and make them available for general military service as soon as possible.

As an approach to this problem the Dental Advisory Committee to the Selective Service System has announced a program for the pre-habilitation of registrants. This program which is being carried on in connection with the medical pre-habilitation program aims to reduce the number of dental rejections. It will attempt by means of education, to have registrants provide themselves with the dental care needed to meet Selective Service requirements, by their own dentist and at their own expense prior to their appearance before their local board for physical examination. The effectiveness of this pre-habilitation program will depend entirely upon the interest of the registrant and upon his desire and ability to secure the necessary dental attention. That all necessary dental corrections for the registrant will not be taken care of in this manner is a foregone conclusion. In view of this it is necessary that dental care be made available to registrants after they have been rejected by the Selective Service board. Registrants rejected because of dental defects will be made dentally fit for military service through the Rehabilitation Program. Dental rehabilitation is, of course, just one phase of a general physical rehabilitation program.

In a press conference on October 10, 1941, President Roosevelt called attention to conditions which have left 50 per cent of our nation's young men of draft age unfit physically or mentally for military service and expressed the fear that this ratio represented a fair index of the health conditions of all Americans.

We learn from Selective Service Headquarters that approximately 1,000,000 men have been disqualified for Army service because of physical, mental, or educational conditions. It is estimated that of this number about 200,000 can be completely rehabilitated and made available for general military service in a reasonably short time and at not too great a cost.

President Roosevelt says he will launch a long-range program calling for the cooperation of states, counties, cities, townships, and individuals to remedy the conditions which have led to this nation-wide health situation. His first step, however, will be to launch a complete physical rehabilitation program to salvage these 200,000 rejected men who can be made available for general service in our armed forces.

REHABILITATION PROGRAM

Mr. Roosevelt has given us a general outline of his rehabilitation program and it is interesting to note that it conforms quite closely to the dental rehabilitation program sponsored by the American Dental Association. He has not announced any detailed plan for the administration of his program nor has he offered any basis to determine or regulate payment for services rendered under the program. It has been stated, however, that the rejected registrant who can qualify for general military service by having his dental defects remedied will have the privilege of having such services performed by the dentist of his choice. And where the registrant does not desire to bear the expense of correcting his dental defects in order to change his classification, the cost of such necessary dental services will be borne by the Federal Government.

The President has expressed the thought that a majority of such persons will be willing and even eager to avail themselves of this free treatment. He added, however, that the registrant is under the jurisdiction of his examining board and can be

directed to undergo whatever treatment this board deems necessary. At the expiration of a specified time the registrant must return to the board, with defects corrected, for re-examination and re-classification.

It is understood that the funds for this rehabilitation program will be administered by the designated Federal agency through official state agencies and state and local dental rehabilitation committees.

The state dental rehabilitation committee should consist of the ranking dental official of the state, representatives of the organized dental profession, and of such other groups as are considered necessary. The local dental rehabilitation committee will be under the jurisdiction of the state committee, and will be composed of the ranking local dental official, representatives of the state committee, of the organized dental profession, and of other groups deemed available. The majority of this committee, just as with the state committee, should be dentists nominated by the organized dental profession. The local rehabilitation committee will pass upon the methods of rendering dental care, standards of dental treatment provided under the program, fees, salaries, and method of compensation for dental services.

During the last World War such necessary services for registrants were performed largely by private practitioners without charge, through an agency known as the Preparedness League of Dentists. Following the declaration of peace the program was discontinued and the lesson it taught was forgotten by the public.

Today we are living in a new era and the public has had the ill effects of dental neglect brought home to them as never before. The public realizes just as does the organized dental profession, that the after-emergency dental health problems may be as serious and will probably present even greater difficulties than those occurring during the present crisis. I feel quite certain the public will not want to see programs designed for the protection of their health pass out of the picture into oblivion with the return of peace. Just what form after-emergency programs will take and how far-reaching they will be in their effect on the private practice will depend largely on the national economic situation and the time, the attitude of our national government, and the private practitioners themselves.

SUMMARY

The American Dental Association representing the dental profession in America, has kept pace with the rapidly changing national economic and health situation and is prepared today to cooperate with the Selective Service System, and with the various branches of military service in their problems. It is prepared to take an active and leading part in the present pre-habilitation programs and in working on other problems relating to the dental health of our nation.

The organized dental profession must be just as well prepared and ready individually and collectively to assume a similar role in the after-emergency dental health problems. We recognize the close relationship between medical and dental problems and how dependent the solution of one may be on the other. The medical and dental professions have enjoyed many years of pleasant association in their approach to common problems. We may look forward to a closer fusion of these relations in the present emergency and the after-emergency problems which lie ahead.

MEDICINE IN AVIATION

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The history of aviation and aviation medicine are so closely interwoven that they are inseparable. Let us escape from the grim realities of the present day to a story of long ago when the first medical studies in aviation medicine were begun and trace its growth from a premature infant to the graceful youth it is today.

From the beginning of time, man has dreamed of soaring through the air like the birds. Ancient mythology is full of

stories of men who flew. Elijah, the prophet, ascended to heaven in a chariot of fire. The ancient Indians had a legend that tells of an "aerial chariot with sides of iron and clad with wings. It was driven through the skies until it stood over Dwaraka and from there it hurled upon the city missiles that destroyed everything which they fell upon." In the 13th century, Roger Bacon, an English scientist, foresaw the conquering of the air. "The mechanism," he wrote, "must be a large hollow globe of copper or other suitable metal—as light as possible. The globe must be filled with ethereal air or liquid fire and then launched from some elevated point—when it will float like a vessel on water." He predicted the heavier-than-air air-craft. "There may be made some flying instrument so that a man sitting in the middle of the instrument and turning some mechanism, may put in motion some artificial wings—like a bird flying."

Francis Bacon (1561-1626) writing the *New Atlantis* had his character to say "we imitate also the flights of birds; we have some degrees of flying in the air; we have ships and boats for going under water—we have also means to convey sounds in pipes." Nostradamus predicted aerial warfare in the 16th century. He said, "For a long time a grey bird shall be seen in the heavens—the armies shall fight in the air a long time and the trees shall have fallen in the midst of the city."

Just 120 years before the Wright brothers flew their aeroplane at Kitty Hawk, N. C., the first medical studies were made on experimental animals to determine the ill effects of an ascent into the vast unknown. A chicken, a duck, and a sheep were placed into a basket beneath a smoke-filled balloon and sent aloft. When they descended they were thoroughly inspected for damage and as they showed none, it was decided to attempt human flight. A prisoner, who was condemned to die, was promised his freedom if he descended to the earth alive, agreed to take the first flight. Not to be outdone, a young Frenchman by the name of de Rozier decided that the honor of the first to fly should be had by himself and not by a criminal. He carried out his plans and made his flight on October 15, 1783, uneventfully. Sometime later, during another flight, while descending, he experienced severe pains in his ears which is the first report of an ill effect of flight. In 1786, we find reference in the literature to anoxemia. A handbook of aeronautics contained the following statement:

"The spirits are raised by the purity of the air and rest in a cheerful composure. In an ascent all worries and disturbances disappear as if by magic due to the change from hot putrid and impure to cool, pure air impregnated with the invigorating aerial acids."

No doubt this "cheerful composure" was a mild anoxemia which was to demonstrate itself more forcefully as higher altitude was gained. About this time Glaisher and Coxwell made a balloon ascent to an altitude of almost 29,000 feet. As they gained altitude Glaisher began to notice that he had loss of vision and that his hearing was failing. Subsequently, his legs and arms became paralyzed. Realizing that he was in danger of collapse, he had presence of mind to pull the valve rope with his teeth and the course of the balloon was reversed, landing safely.[1]

The first physician to devote his entire time to the study of medical problems of aviation was Paul Bert, a Frenchman, who worked on many problems and wrote a book describing his findings. Unfortunately, a flight carried out by three of his friends under his supervision ended in disaster. They ascended to 25,000 feet. Bert had warned them to use oxygen so as to prevent anoxemia. Because of the small amount of oxygen they carried, they decided to be conservative and use it when a high altitude was reached. Then, as today, anoxemia affected man's judgment and memory and the oxygen was never used. The balloon descended of its own accord. Two of the three were dead.

Following the work of Paul Bert, there was little interest in aviation medicine until several years after the invention of the air-

plane. Later, medical men began to consider the selection of men best suited as pilots. The pioneer work was carried out by the German Army in 1910. Previous to this time, the Germans had trained many of their officers as pilots. These officers had been carefully studied and because of these studies they came to the conclusion that those who flew required certain special aptitude and physical endowments not required of the ground crew and consequently drew up the physical standards for their pilots. Their pilot selection was systematically and methodically studied and in contrast to the English was greatly improved. The English, on the other hand, at the beginning of World War I not only used unselected pilots but men who were found unfit for other types of duty were assigned to aviation for flying training. As you can imagine, the results were disastrous. At the end of the first year it was found that out of every hundred pilots killed, two died in battle, eight from defective planes and 90 from defects in the pilots. Also, it was found that half of the pilots who were trained were breaking under the stress of war with nervous diseases. Following this the Allies began to correct their mistakes. Medical research units were set up and the results for the better were astounding.

Much knowledge was gained by the World War. In 1917, the Army School of Aviation Medicine was established and in 1918 medical personnel trained in aviation was sent by us to France. Following the war, better selection of pilots was stressed. In 1926, the department of air commerce was established. In order to promote public safety, oxygen equipment was installed in 1937 and pressure cabin aircraft in 1940.

THE FLIGHT SURGEON AND THE PILOT

Since the approach of the second world conflict, great strides have been made in aviation. The increase in size, weight, and maneuverability and technical complications of aircraft have placed many additional problems into the hands of the flight surgeon. The term "flight surgeon" was first used in 1918 and is now widely known in this country and abroad. The flight surgeon must have a solid foundation of general medical knowledge crowned by an adequate fund of special knowledge. In this country, no one but properly qualified flight surgeons are permitted to conduct military examinations. He must have that depth of human understanding which will inspire confidence of those under his care and cause them to turn to him for guidance and advice in times of stress and strain.[2] The duties of the flight surgeon may be divided into four general classes: (1) He must be a physician and must always remember that he is a doctor first and a flight surgeon second; (2) pilot selection; (3) care of the flyer, and (4) research into medical problems evolving from flying.

Pilot selection has progressed by the trial and error method until today we have reached a high physical and psychologic standard which is producing fair results. Successful pilots will usually fall into a general group physically and psychologically. We desire young men between the ages of 20 and 27 with two years of college training, who give no history of chronic diseases. They must not be too tall to fold into a cock-pit nor too short to reach the rudder bars. On the average, the athletic or stocky build is more desirable than the angular type. From the pulse rate supine, standing, and after exercise and blood pressure readings supine and standing, we arrive at the circulatory efficiency index which is known as the Schneider test. No neurocirculatory asthenia is tolerated. Relaxed rings are not desirable as dive bombing markedly increases the intra-abdominal pressure with the possibility of rupture later. The family and personal history should be free of nervous and mental diseases. It is necessary that they have a vital interest in aviation with desire to fly. No one can be a successful pilot unless he has the will to fly. He should have psychologic traits of emotional warmth and ability to relax completely in contrast to the inhibited tense and overreacting person. Under stress of examination, we look unfavorably upon a candidate

who shows excessive perspiration, cold moist palms, dilated pupils, tremors of fingers, lips, tongue or eyelids, hyperactive reflexes, and mottling of skin. History of epilepsy, migraine, acrophobia, air-sickness, and enuresis are disqualifying. Available psychologic tests leave much to be desired. We use a modification of the Otis S-A test. Visual acuity must be 20/20 or better in each eye. Range of accommodation, depth perception, heterophoria, and angle of convergence must be well within normal limits. The central color vision and visual fields are normal. Retinoscopic examination under cyclopegia is determined. The eustachian tubes must be patent. Good labyrinthine function is necessary for all flyers so that they may maintain a satisfactory relationship with the airplane.

Now that we have selected our pilot, let us consider how we may keep him flying. The problem of health for those who fly divides itself into three factors. The first of these has to do with those problems of hygienic and preventive medicine common to everyday life. Second, annually, each flyer must pass the flight physical examination if he wishes to remain in the air. Flight physical examinations are given immediately following the pilot's change of station or following any accidents or illnesses. The third problem arises as a result of flight itself. The performance of modern aircraft has now developed to the point where it exceeds the endurance of the human body. The damage connected with these problems is very real and often very serious. From now on while in the air, the pilot must know and be able to recognize the complications as they arise and the treatment thereof.

PHYSIOLOGIC DISTURBANCES

Altitude sickness, or anoxemia, is caused by the lack of oxygen as one ascends. The first symptoms begin at about 5000 feet. At this height the depth of breathing is slightly increased. At 12,000 feet, the depth of breathing is about doubled but the rate stays normal. Above 12,000 or 15,000 feet definite signs of mental and physical impairment appear. At 18,000 one passes a critical point. Here the air pressure is one-half of what it is at sea level and the pilot must breathe twice as fast. The heart pounds, the head aches, the memory is poor, and the pilot is not able to perform any work. Eighteen thousand feet is the highest altitude at which man can live without unconsciousness and death unless oxygen is available. (Altitudes in thousands of feet: 30—death; 25—unconsciousness; 18—incomplete adjustment; 10—satisfactory adjustment; 5—complete adjustment.)

For prevention of anoxemia, the pilot must either fly at a low altitude or take oxygen by means of a mask or pressure suit, or by pressure cabin airplane. Recently, much work has been done on anoxemia in low pressure chambers.

The opposite effect of anoxemia is hyperventilation. Hinshaw describes the symptoms as feeling weak, dizzy, anxious, and a sense of tingling and numbness of the fingers, which might interfere with handling of the plane. This, if allowed to continue, will cause the pilot to forget to breathe and he will pass out cold. This is prevented by using a re-breather bag. If hyperventilation occurs the pilot should hold his breath and quickly the symptoms will clear up.

Dive bombing is an ordeal for even the most healthy pilots. From a height of 25,000 feet the plane is turned vertically downward to descend at speeds of 500-600 miles per hour; then when nearing the earth, turned suddenly again into a horizontal position. Centrifugal force drives the blood from the cerebral vessels into the larger vessels of the abdomen and brings temporary unconsciousness or the so often described "black-out." During the black-out the pilot is at the mercy of his opponent and the few seconds may be enough for the enemy to attain the advantage and destroy him. No fool-proof method has been found to prevent it but Armstrong says that the forward crouch is the most satisfactory. Many pilots scream to increase the intra-abdominal pressure. Wide inflated abdominal belts are of some help. It is reported that the Germans have a "water suit" made of rubber which is worn next to the skin.

After the outer clothing has been donned the suit is filled with water. Thusly clothed, the pilot "floats" in his suit as a fetus might *in utero* and a uniform compression over the body is obtained in acceleration, and sudden change of direction.

During the World War I, it was thought that equilibrium was purely a vestibular problem and most of the emphasis was placed on the vestibular apparatus. The secret of the pilot's balance while flying is found in his eyes rather than in his internal ears. It is commonly known that a pilot is unable to keep his ship on an even keel, no matter how perfect the mechanism of the inner ear, unless he can see the horizon or has learned to fly by instruments; and in the event of the latter, he must disregard the sensations of the inner ear, and trust his instruments. Most vestibular tests for prospective pilots are now being abandoned. If the candidate can stand on each foot alternately with his eyes closed and has no pathology of the ear, his aural balance is considered normal.

Air sickness usually develops during acrobatics or rough air. It may develop in level flight in those who have fear of flying or who are susceptible to it. The symptoms, like those of seasickness, are nausea, pallid face, clammy skin, and vomiting. No drugs are satisfactory as treatment. The cure for air-sickness is a comfortable rocking chair beneath a big oak tree.

It has been observed that if pilots were allowed to fly too much, they would become restless, irritable, and highly nervous. This was termed fatigue. Armstrong described adequately a syndrome of symptoms which he termed "aeroneurosis." The symptoms are insomnia, fitful sleep, unpleasant dreams and extreme depression upon awakening in the morning. Frequently the pilots complain of indigestion, similar to that of mild gastric ulcer, most often noticed after a hard day of flying. The treatment of aeroneurosis is adequate rest. The pilots should not be allowed to fly more than 85 hours per month. If they exceed this amount, staleness will develop. It is always desirable that the flight surgeon keep in close contact with the pilots in his care. He should fly with them as often as practical so that he may be able better to keep them in the best state of mental and physical fitness which is so necessary in their hazardous occupation.

Let us pay tribute to the many brave and courageous pioneers who sacrificed their all that we might fly and to the flight surgeons of the Army Medical Corps who have labored long and have contributed much to aviation medicine. Even though the field is still young and growing rapidly, the ideas and principals laid down by the original army flight surgeons are still very important and time has only emphasized their value.

SUMMARY

The mission of the flight surgeon could be aptly summarized as follows: To keep as many pilots, as comfortable, in as many planes, as many hours, as practical.

THE USE OF SULFONAMIDES IN ACUTE INFECTIONS*

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Beginning with the publication of Damagk's report in 1935, of the curative effects of prontosil in experimental streptococcal infections, chemotherapy underwent a great revival. In the early uses of the dye, and its derivatives, the use was rather indiscriminate, and some used them as cure-all. Today we are beginning to recognize the use and limitations of the drugs. The older form has given way to derivatives, each having a selective action on specific organisms, and certain limitations. It is the purpose of this paper to point out the better known facts in order that a more rational choice can be made in the selection of the correct drug, both as to the effectiveness against invading organism, and the fate of the drug in the body, and its limitations. It must be borne in

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mind that these are powerful drugs, capable of producing harm. A thorough study should be made of the patient as to his general condition, determination of the specific organisms, to determine if renal damage is present, and a complete blood picture and possible blood typing done for future reference.

SULFANILAMIDE

Sulfanilamide is the oldest derivative, and most known about it, and still used in infections in which one of the newer drugs is also effective. With the exception of sulfadiazine, it is the easiest drug with which to maintain constant levels in the blood. It diffuses well into the tissues, and freely enters the spinal fluid. Not more than 15 per cent is acetylated into inactive form, so that it is usually not necessary to make allowances for conjugation. It is an excellent drug in meningitis,[1] hemolytic streptococcus[2] and *B. welchii*.[3] In staphylococcal infections[4] it is of lesser value than sulfathiazole and sulfadiazine. Erysipelas[5] appears not to be affected to a great extent, but the incidence of complications appears to be decidedly lessened.

Dosage: When the infection is severe, it is desirable to obtain high concentration in the blood as soon as possible, and a large initial dose should be given. This rule likewise holds true with the other sulfonamide drugs. The initial dose should be 0.1 gram per kilo of body weight (2.2 pounds). It may be advisable to crush the tablets and mix with water to secure quick absorption. In severe vomiting, the drug may be dissolved in sterile water, and diluted with physiologic saline or Hartman's solution to make a one per cent solution (100 c. c. to a gram of the drug) and given as an infusion. Following the initial dose, its equivalent should be given daily, in six equal doses every four hours, day and night, and continued until there is improvement. There should be a tapering off, and continuation for a time after the patient is apparently well, to prevent relapses. In mild cases, the large initial dose may not be necessary, and 0.05 to 0.075 gram per kilo is as a rule sufficient. The daily requirements should be given in six equal doses.

SULFAPYRIDINE

The introduction of sulfapyridine was a great step forward in the treatment of pneumonia,[6] and many lives were saved by it. The drug proved much more effective against pneumonia than sulfanilamide, and many physicians today feel that it is still the drug of choice. It is also effective against gonococcus.[7] Unfortunately there are numerous disadvantages which limit its usefulness, and it has largely been discontinued in favor of other sulfonamide drugs. It is rather erratically absorbed, and in many individuals a large percentage undergoes acetylation, or rendered inactive. Often there is severe vomiting, which makes further uncertainty of the absorption.

Therefore it is important that a close check be maintained to determine the concentration of both the free and conjugated forms in the blood. There is a great tendency to crystallize out in the kidney, and cause renal damage[8] if an adequate intake of fluids is not maintained.

Dosage: In pneumonia, the initial dose is 4 grams, followed by 1 gram every four hours until resolution is well under way, or the temperature is normal; to be followed by 0.5 gram every four hours until the patient is out of bed, to prevent relapses. In gonorrhea the use of sulfapyridine is practically discontinued. In patients severely ill, it is often advisable to use sodium sulfapyridine intravenously, to insure absorption of the drug, and especially so, where vomiting is severe.

SULFATHIAZOLE

Sulfathiazole is readily absorbed and excreted, and its penetration into the tissues is good, except that it does not enter the spinal fluid very readily, and that portion which does is in an inactive form. Hence, it is not advisable to use it in meningeal infections. There is less tendency towards acetylation than with sulfapyridine, but slightly more than sulfanilamide. Because

of the rapid excretion, it is important to make careful check of the blood levels to secure adequate concentration. There is but little toxic effect, and practically no vomiting with sulfathiazole, though there are reports of severe renal damage[9] caused by the crystallization of the conjugated forms in the kidney. The principal indication for sulfathiazole is in infections due to staphylococcus,[10] pneumonia,[11] colon bacillus,[12] *B. welchii*,[13] and gonococcus.[14] The general rules of a large initial dose of 4 to 5 grams, followed by 1 gram every four hours day and night, and the continuance of the drug after improvement should be followed. High intakes of fluids should be maintained. Sulfathiazole has become one of the most important of the sulfonamide drugs.

SULFADIAZINE

The new drug, sulfadiazine, promises to be superior to the older drugs, at least in certain instances. One of its advantages is that it appears to be less toxic, and at the same time, about as effective against the invading organisms. Only a small portion is acetylated, and this form is more soluble, hence less danger of kidney damage.[15] Furthermore, the upper levels of the blood concentration obtainable by oral administration has less toxic manifestations. It readily disseminates through the tissues, and enters the spinal fluid readily. It is a suitable drug to use in pneumonia,[16] excellent in streptococcal,[17] staphylococcal,[18] meningeal,[19] and *B. coli*[18] infections. In urinary track infections, because of its action against both *B. coli* and staphylococcus, and because of less danger of renal damage, it is the drug of first choice. In gonorrhea[20] it is as effective as the other drugs. There are good reports of effectiveness against *B. welchii* infections,[21] and some effectiveness against pemphigus,[22] both in adults and the newborn.

The dosage, and general directions are the same for the other drugs of the same type.

SULFAGUANIDINE

Sulfaguanidine has a rather limited range of use. It is readily soluble, but poorly absorbed from the intestinal track, and its selective action appears to be practically limited to the organisms of the dysentery group. Because of the low degree of absorption, high concentration can be maintained in the intestinal track with little danger of toxic manifestations due to high concentration in the blood. The initial dose should be 0.1 gram per kilo, followed by 0.05 gram every four hours, day and night, until the stools are four or five or less per 24 hours, followed by 0.05 gram every eight hours for 48 to 72 hours, to prevent recurrences.

CHOICE OF SULFONAMIDE DRUGS AS TO INFECTIVE ORGANISM

St. hemolyticus	Meningococcus*	B. dysenteriae	Staphylococcus	Gonococcus
1. Sulfanilamide	1. Sulfanilamide	1. Sulfaguanidine	1. Sulfathiazole	1. Sulfadiazole
2. Sulfadiazine	2. Sulfadiazine		2. Sulfadiazine	2. Sulfapyradine
3. Sulfathiazole	3. Sulfapyridine		3. Sulfapyridine	3. Sulfadiazine

Lymphogranuloma inguinale	Pneumococcus	B. welchii	B. coli
1. Sulfadiazine	1. Sulfadiazine	1. Sulfathiazole	1. Sulfadiazine
	2. Sulfathiazole	2. Sulfadiazine	2. Sulfathiazole
	3. Sulfapyridine	3. Sulfanilamide	

*Meningococcus or any infection of meninges: Sulfathiazole does not enter spinal fluid readily, and that portion which does is inactivated.

TOXIC MANIFESTATIONS

All the sulfonamide drugs produce toxic manifestations which are generally similar. Recovery is usually quick after the drug is stopped, and treatment can usually be continued with another derivative, since their toxicities are not generally additive. There are two groups of toxic manifestations, the unimportant and important.

Unimportant manifestations: Nausea and vomiting; usually seen with sulfapyridine. Dizziness; common except with sulfapyridine. Cyanosis; usually with sulfanilamide, rarely with others. Mild hemolytic anemia; not uncommon with sulfanilamide and sulfapyridine.

The development of the unimportant symptoms does not necessarily call for withdrawal of the drug, but these may be the forerunners of severe toxic reactions.

Important or dangerous manifestations: Fever; usually fifth to ninth days, and after fever due to infection has subsided, or at least dropped, and frequently rash or injection of sclerae, fever and rash not dangerous in themselves, but often precursors to: acute hemolytic anemia, a serious complication; hepatitis, a rare complication; hematuria, not uncommon with sulfapyridine and sulfathiazole, occasionally with sulfadiazine; anuria, a grave complication; agranulocytosis, the gravest complication, and most apt to develop in debilitated patients where the drug is given over a long period of time.

With the development of grave complications, it is best to stop the drug, and treat the patient symptomatically; however in urgent cases, it may be advisable to continue the drug and treat complications concurrently, except in anuria and agranulocytic anemia.

SUMMARY

1. The sulfonamide drugs fill a long desired need for specific drugs against many organisms.

2. When employing these drugs, a careful study must be made of the patient.

3. The specific organisms causing the illness must be determined.

4. The proper drug should be used, considering its specific action, its fate in the body and excretion.

5. It must be borne in mind that these are powerful drugs, capable of producing severe damage, and should not be used in minor infections.

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DISCUSSION

Dr. J. P. Sanders (Shreveport): I feel that Dr. Barber has covered this subject and it is complete without much discussion by me.

The first fact I wish to mention is that these drugs are chemotherapeutic in their action; that they have little direct action on organisms themselves. In certain complications, as in ruptured appendices and infected wounds, where one of the drugs is placed on the tissues themselves, there seems to be some stimulation in the tissue of effect of the drug. While the drugs are specific in reaction toward many infections, each drug seems

to have a specificity all its own, as brought out, and it seems to behoove us to find the drug which is most suitable in each infection being treating.

The drug concentration seems to be rather important, as Dr. Barber brought out. Large doses, far apart, are better than small doses closer together. In this way there is better concentration at one time. There is a remarkable similarity between reaction and concentration of these drugs. The experience of some of us has been that intravenous medication seems to be better in more severe infections. You get high blood levels in intravenous medication and in some cases avoid bad effects. Some dangers are there all the time but may not be sufficient to cause damage. When using the drug the patient should be watched by the physician at all times and sulfonamides should not be given without a physician's prescription.

Dr. B. J. Aymond (New Orleans): I would like to ask Dr. Barber if he uses any alkalies with these drugs. Originally it was indicated that some form of alkali, like soda bicarbonate be used; is that practice employed now?

Dr. Harry Koretsky (Pineville): Is sulfathiazole absorbed like sulfapyridine into the spinal fluid? My understanding is that sulfathiazole is not readily absorbed, while sulfapyridine is. Dr. Barber states the reverse.

Dr. D. B. Barber (In closing): There was so much to this subject that I tried to condense it as much as possible.

In answer to Dr. Aymond, I will say we do still use alkalies with sulfonamide drugs.

In answer to Dr. Koretsky; sulfathiazole is readily absorbed into the spinal fluid. Sulfathiazole should never be used in infections of the meninges.

THE USE OF DEPROTEINATED PANCREATIC EXTRACT IN THE TREATMENT OF URETEROSPASM

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The urologist who is called upon to treat such ureteral conditions as calculus, stricture and spasm is confronted with two problems. The first is the management of the actual disease state. The second is the control of the symptoms which arise from the method of therapy employed. A further complication of the latter problem is the fact that although dilatation of the ureter is the accepted method of treatment of all the ureteral states mentioned, the results are frequently only temporary in stricture and spasm. Repetition of the dilatation therefore may be necessary at more or less frequent intervals and recurrence of the reaction can be expected in most cases.

Advances in topical anesthesia have minimized much of the discomfort formerly associated with the introduction of the cystoscope into the urethra, but this variety of analgesia offers no help in passing a ureteral obstruction, for the successful performance of which the patient must be completely relaxed. It is, therefore, frequently necessary to resort to intravenous or inhalation anesthesia, the repeated administration of which is obviously undesirable if it is at all possible to avoid it. Furthermore, neither general nor local anesthesia controls the reaction which often occurs after instrumentation and which may include reflex gastrointestinal disturbances as well as colic and pain. Narcotics sufficiently potent to control this type of reaction obviously should not be used frequently, both because they are likely to be habit-forming and because they may, of themselves, cause additional gastrointestinal disturbances. On the other hand, the less powerful opiates are often entirely ineffective.

The urologist, as a result, is often on the horns of a dilemma. There is something psychologically unsound in offering a patient relief which may be only temporary but which nonetheless involves a period of exaggerated discomfort or actual suffering as well as a period of disability, either in the hospital or at home, with its attendant expense and loss of time. We have in our own files the records of a number of patients, who in spite of the relief which they admitted they secured from dilatation of the ureter, were unwilling to continue treatment, or continued it only after urgent persuasion, because of the severe discom-

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fort, sometimes lasting for as long as a week, which followed instrumentation.

Of the antispasmodic agents which we have employed in the past, only two have been sufficiently useful to be worth mentioning. Trasentine (diphenyl - acetyl - diethyl - amino - ethanol - hydrochloride) and syntropan (di-ethyl - amino - dimethyl-propanolester of tropic acid) have both relieved ureteral colic in a number of our patients, but the good results have been neither striking nor uniform. In a small series of cases we injected pentothal sodium solution (6 c. c. of 2 per cent solution) into the ureter through the dilating catheter in the hope of minimizing ureterospasm, but the results were so uneven and uncertain that we soon discontinued its use.

For the past thirteen and a half months we have used deproteinated pancreatic extract in the treatment of patients who required dilatation of the ureter and the results have been so satisfactory, both in the relaxation secured during instrumentation and in the control of post-instrumentation spasm, that we feel warranted in placing on record a small series of cases in which this method has been employed.

Our studies were made with a greatly refined deproteinated pancreatic extract. This is a saline solution of a chemically derived, protein-free nitrogen fraction obtained by the acid-alcohol treatment of beef pancreas. It is adjusted to a pH of 6.5 and 6.8 and is tested for freedom from insulin, histamine and other extraneous substances. It is also tested qualitatively as to its physiologic properties.

HISTORICAL NOTE

The clinical use of deproteinated pancreatic extract began in 1926 when Frey and Kraut[1] employed a pancreatic extract which they had prepared themselves in the treatment of intermittent claudication. They found it very useful in controlling the crural pain of this condition. Their observations were confirmed in 1929 by Gley and Kisthinios,[2] who used an extract which they had prepared by another method and who extended its use to angina pectoris. In 1931 Wolffe and his associates[3] secured therapeutically similar results by an extract (antisympatone or desympatone) prepared by a modification of the Gley and Kisthinios method. Since that time a number of other observers[4,6] have used pancreatic extract, as well as extracts of skeletal muscle, in various heart conditions and in various types of peripheral vascular disease. A high percentage of successful results were secured in all reported series, though not all of the cases included seem to have been chosen wisely.

Lazarus,[7] in 1936, first used pancreatic extract in the treatment of impacted ureteral calculi and ureteral spasm. In eight cases of impacted stone and two of ureteral spasm the method failed in only one instance, in which a large stone with spicules was embedded in the ureteral mucosa.

Van Duzen, in discussing a paper by Carroll and Zingale[8] to be mentioned shortly, reported that he had secured good results in ureteral stone by the use of pancreatic extract, although his results were less good in spasm and stricture. Ballenger, in a discussion of the same paper,[8] also reported good results from the use of pancreatic extract in post-instrumentation kidney colic. Duncan,[9] in 1941, reported, without details, the successful use of pancreatic extract in approximately 70 per cent of more than 500 cystoscopies. So far as we can determine, these are the only reported series in which this method has been used for the control of ureteral spasm.

Just how deproteinated pancreatic extract acts is still not clear. The use of modern preparations, tested for freedom from insulin, histamine and other extraneous substances, would seem to answer the argument, formerly advanced, that the presence of these substances might be responsible for the results secured. Gley and Kisthinios,[2] who agreed with Frey and Kraut[1] that pancreatic extract has vasodilator effect, also believed that it might have a depressor or inhibiting effect on the sympathetic nervous system, in accordance with the suggestion, advanced by Lowei in 1908, that the internal secretion of the pancreas might possess this property. Van Duzen,[8]

whose results were less good in spasm and stricture than in stone, thought that this difference furnished some proof that the extract acts as a brake on the production of epinephrine, as Wolffe and his associates[3] also believed.

Lazarus[7] explained the rationale of the use of pancreatic extract in ureteral spasm on the basis of Wharton's[10] studies, which demonstrated an independent nerve supply for the ureter. The ureteral wall is made up of smooth muscle tissue and the cause of the impaction of calculi is assumed to be spasm of the ureteral musculature in the portion of the wall surrounding the calculus. The fundamental cause of the spasm is over stimulation, from the irritation of the calculus, of both the intrinsic and extrinsic nerve fibers supplying the affected segment of the ureter.

The investigations of Carroll and Zingale[8] seem to leave no doubt that pancreatic extract actually affects the ureteral tissue. Their hydrophorographic studies showed that after the injection of this substance there was complete cessation, within 90 seconds, of waves which had previously been observed in the ureter. The cessation lasted for from 5 to 20 minutes, though occasionally repetition of the injection was necessary to secure this effect. In one instance of hyper-irritable ureter the waves were of great magnitude and frequency, and the patient complained of pain as each came on. Ninety seconds after the administration of the pancreatic extract the ureteral movements ceased altogether, and although they returned during the period of observation, the patient no longer complained of pain.

Although the action of pancreatic extract is still not clear, it is of interest, in this connection, that Frey and Gley[11] in 1939 reported an internal secretion of the pancreas which could be isolated from the urine while the pancreas was in situ but which showed a sharp decrease after pancreatectomy. This secretion is readily differentiated from insulin. Frey and Gley[11] consider its active agent to be a hormone elaborated by and stored in the pancreas, which passes into the blood in an inactive form and is excreted in the urine in an active state. Its properties are apparently identical with those of extract previously prepared from pancreatic tissue by these and other observers.

PERSONAL STUDIES

Until April 1, 1941, we had for many years followed the same routine in all cases of ureteral stone or spastic ureteritis in which dilatation was required. The patient was admitted to the hospital two hours or more before the scheduled cystoscopy. One hour before the time set 3 grains of phenobarbital sodium was administered by mouth, followed, 30 minutes later, by a hypodermic injection of pantopon grain 1/3 and of atropine sulphate grain 1/150. An ounce of metycaine (2 per cent) was used locally as a surface anesthetic for the bladder and urethra. If the patient was not sufficiently relaxed, inhalation or intravenous anesthesia was used supplementally. Our present routine differs from the method first outlined in that now, just before the introduction of the cystoscope, the patient is given an intramuscular injection of 3 c. c. of deproteinated pancreatic extract.

Dilatation is then carried out by means of olivary-tipped or tapering-tipped ureteral catheters, ranging in size, as a rule, from 7 to 11 F. Multiple smaller indwelling catheters are sometimes substituted in dealing with impacted ureteral calculi. If dilatation alone is necessary, the graduated catheters are merely inserted and withdrawn. When calculi are present and single indwelling catheters are used, progressively larger ones are inserted at 24 to 48 hour intervals until the stone is passed.

Before April 1, 1941, patients were treated after instrumentation with various sedatives, such as the barbiturates or pantopon, or, if necessary, with more potent drugs, such as morphia, the medication being gauged by the necessities of the individual case. Now, in place of the sedation formerly employed routinely, additional injections of deproteinated pancreatic extract, usually in 3 c. c. doses, are used every three hours for four to six doses, that is,

for a period of 12 to 18 hours. If necessary, further injections, usually in 2 c. c. doses, are given in the hospital or at the home or office every 48 hours until all discomfort from the instrumentation has disappeared.

RESULTS

Although this communication is not intended as a statistical study, we have compared the 70 patients treated with deproteinated pancreatic extract in the 12 months' period ending April 1, 1942, with a contrast series of 72 patients treated without the extract in the similar period ending April 1, 1941. Twenty-eight patients in the pancreatic extract series and 25 in the control series had ureteral stones, and 42 in the pancreatic extract series and 47 in the control series had spastic conditions. Several patients in both series had from two to four dilatations each. Twenty-five patients in the control series also appear in the series treated with pancreatic extract. Of the 47 patients with spasm in the control series, 19 had very severe and 16 moderately severe post-instrumentation reactions; the remainder had either mild reactions or none at all. Of the 25 patients with stones in the control series, 11 had very severe and five moderately severe reaction; the remainder had either mild reactions or none at all.

In seven of the 70 patients treated with pancreatic extract, the results were no better than would have been expected with the former routine. The remainder of the group, however, either had no reactions or very mild reactions, the difference being particularly notable in patients who had been treated by the former routine, in which pancreatic extract was not given. In a few instances in which the extract alone was not effective the addition of pantopon brought quick relief, although in several of these cases the sedative, when used alone, had given no relief at all.

Occasionally a patient is discharged from the hospital within 12 hours after instrumentation, though we prefer to keep most patients hospitalized for at least 24 hours. Thereafter the duration of hospitalization depends upon whether or not indwelling catheters are used as well as upon the character of the reaction. Generally speaking, when the ailment is of long standing or if the patient has been neglected or badly treated, so that infection complicates the picture, hospitalization may be required for from five to seven days or even longer. It is difficult to estimate the results of pancreatic extract therapy in terms of hospitalization, for that reason, in addition to the considerations already mentioned, financial considerations often cannot be ignored. We have frequently, albeit reluctantly, permitted patients with ureteral colic to leave the hospital within 24 hours because their finances would not permit a longer stay. An obvious practical advantage of pancreatic extract therapy is therefore that patients can be discharged as soon as the immediate post-instrumentation reaction is over, or, if stones are present, as soon as they are passed, and that they can be ambulatory and do their regular work even if additional injections of the extract be necessary.

COMMENT

The inclusion in the pancreatic extract series of patients treated by the former routine, in which it was not included, furnishes further proof of the efficacy of this preparation. The criticism that the use of any new drug always brings good results, for psychologic reasons, is scarcely valid. In no instance did any patient know that he had been treated by a new method until he himself had commented on the absence or mildness of the post-instrumentation reaction. We observed no particular difference in the effect of the drug on the nervous and on phlegmatic patients except that hypersensitive patients, who formerly required or, in the light of past experience, probably would have required large amounts of sedatives now required small doses or none at all.

The sole effect of deproteinated pancreatic extract seems to be to relax spasm. The patient is not disoriented nor do his mental faculties become clouded, effects which make the continued use of nembutal,

pantopon and similar sedatives highly undesirable. As a matter of fact, the very nature of these sedatives requires that the patient be kept under observation in the hospital or in bed at home. There is some stinging and burning at the site of injection of the pancreatic extract immediately after it is administered but the discomfort is only transient, and there are no other side effects.

We are not prepared to substantiate at this time observations by other urologists claiming that this substance expedites the passage of calculi. Dilatation of the ureter, whether for spasm or for stone, is inevitably followed by a certain degree of traumatic edema of the mucosa. As long as the edema lasts, a stone necessarily remains stationary. We doubt that the duration of the edema is decreased by the use of pancreatic extract. There seems no reason to doubt that post-cystoscopic ureteral colic is markedly decreased and that the relaxation secured by this agent makes the descent of the stone far less painful if not entirely painless.

Although, as had been mentioned, it is difficult to reduce the duration of the hospital stay to a statistical basis, the shortened periods for which patients are hospitalized is one of the definite advantages of this new method, as is the shorter period of disability. These are both important considerations at a time when hospital facilities are likely to be increasingly taxed and when loss of man hours of work is a matter of increasing national significance.

To date we have used deproteinated pancreatic extract only by the intramuscular route. Experimental evidence, however, suggests that the intravenous route is safe with the purified preparations now available, and that relatively large doses can be used if the injection is made very slowly.[5]

CASE REPORT

Typical of the results secured by deproteinated pancreatic extract is the following case history:

Mrs. T. E. S., a white female aged 34 years, underwent a hysterectomy for uterine fibrosis in 1939. Three weeks after operation she developed bilateral lumbar pain, a temperature elevation to 103°F., and pyuria. Urine from both kidneys showed large amounts of pus with *Escherichia coli*, and urography demonstrated spastic ureteritis in the lower third of each ureter, more marked on the left. The patient was treated by lavage of the renal pelves and sulfacetimide until her general condition was sufficiently improved to permit ureteral dilatation.

For two years after her original attack the patient required dilatation every four to six months to control her symptoms, which continued to be particularly troublesome on the left side. Hospitalization for from three to seven days was necessary after every instrumentation, and pantopon and other sedatives were only partially successful in controlling the reaction. In spite of the discomfort, the inconvenience and expense of hospitalization, and the loss of time, the patient felt sufficiently relieved by the treatments to be willing to continue them. Dilatation of the ureter has been carried out twice in the last 12 months, with injections of deproteinated pancreatic extract added to the usual routine. The absence of reactions has been most gratifying, and each time the patient has left the hospital, in excellent condition, within 24 hours.

SUMMARY AND CONCLUSIONS

1. The control of symptoms following dilatation of the ureter is often a serious problem in the management of ureteral conditions in which spasm is a feature.

2. The use of deproteinated pancreatic extract before and after instrumentation has been attended with excellent results, both in the relaxation secured during the procedure and in the control of the post-cystoscopic spasm.

3. The history of the development of this method is briefly outlined.

4. A series of 70 cases of ureteral stone and ureterospasm treated by deproteinated pancreatic extract is analyzed in comparison with a control series of 72 similar cases treated by the same routine except without the extract.

5. The use of deproteinated pancreatic extract in patients who must be subjected to ureteral dilatation is a simple and effective method of facilitating the procedure and controlling the post-instrumentation reaction. Patients thus treated can usually be dismissed from the hospital, in the absence of contradictions, within 24 hours after simple dilatation, or, in calculus

states, as soon as the stone is passed. There are no deleterious side effects.

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A PHYSIOLOGIC CONCEPT OF TISSUE RESISTANCE IN THE SURGICAL DIABETIC*

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Lowered tissue resistance in diabetes is a well established fact. The exact nature and cause of this serious handicap is a problem of much perplexity and controversy. With the present knowledge of the pathologic physiology of diabetes and with the more recent contributions in the fields of immunity and therapy, our concept has changed considerably. The excellent results obtained in an experience of more than 100 cases of surgical diabetics during the last three years have encouraged a detailed consideration of this concept.

STATISTICS

GENERAL MORTALITY[1]

	Cases	Deaths	Mortality Per Cent
John (1938)	1273	74	5.8
Standard, et al. (1938)	474	75	15.8
McKittrick (1939)	1276	102	8.0
Joslin, et al. (1940)	2941	231	7.9
Authors (1939-1942)	104	4	3.8

MORTALITY IN MAJOR AMPUTATIONS[2]

	Cases	Deaths	Mortality Per Cent
Zucha (1937)	100	32	32.0
Arnell (1938)	170	65	38.0
Standard, et al. (1938)	70	26	37.1
McKittrick (1940)	495	69	13.9
Authors (1939-1942)	26	3	11.5

MORTALITY IN CARBUNCLES[3]

	Cases	Deaths	Mortality Per Cent
Walters, et al. (1934)	16	3	18.7
Standard, et al. (1938)	45	7	15.5
McKittrick (1939)	71	4	5.6
Authors (1939-1942)	14	0	0

LOWERED TISSUE RESISTANCE IN DIABETES

In a discussion of the nature and cause of lowered tissue resistance in diabetes, various factors must be reviewed:

1. Increased sugar content of blood and tissue
2. Intrinsic physical and chemical alterations of the tissue fluids and cells
3. Subnormal immunologic reactions
   a. Antibody formation (amboceptor)
   b. Activity of complement in blood
4. Malnutrition
   a. Low glycogen reserve
   b. Hypoproteinemia
   c. Vitamin C deficiency.

An increased sugar content of blood and tissue is the earliest idea of lowered tissue resistance and was suggested immediately after the character of the disease was recognized. Lassar[4] held that view in 1904 and that opinion still prevails among the medical profession despite the fact that a great deal of work to the contrary has been published. Handman[5] demonstrated that the addition of glucose to the blood in amounts

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corresponding to the limits encountered in diabetic individuals was no better a culture media for bacteria. More recently Richardson[6] has studied the problem in the experimental animal and concludes that hyperglycemia per se cannot be the cause of lowered tissue resistance. Bayne-Jones[7] was convinced that the explanation had to be sought elsewhere and suggests that hyperglycemia may cause it by other means than the increased sugar content alone. Pillsbury and Kulchar,[8] as well as Mosenthal,[9] concluded that the dehydration that resulted caused many physical and chemical alterations in the cells and fluids of the host, which definitely influence the functional capacity of the cell unit. A similar state could be produced by dehydration initiated by other means.

A subnormal immunologic response as an essential factor concerned in tissue resistance has gained more prominence lately. It is by no means a new idea; however, the average physician fails to realize its importance. In considering this defensive mechanism the defective antigenic response is one part of the deficiency, while subnormal activity of blood complement may be another.

Da Costa,[10] in 1907, reported a 30 per cent lower opsonic index, among diabetics tested with a variety of bacteria. Horster[11] discovered that although the complement remained unchanged, the phagocytic power of the leukocytes was decreased. Recently Kestermann and Vogt[12] emphasized the importance of opsonin as a resistant factor in the diabetic and claims that it is more essential than bacteriolysins. Their experiments confirm the work of other investigators that the opsonic index is directly related to the degree of stabilization of the diabetes. Bayer and Form[13] have demonstrated an increase in phagocytosis with the administration of insulin.

Using typhoid vaccine, Moen and Reimann[14] found a poor agglutinin response in the diabetic varying in direct relation to the degree of disturbed metabolism. Richardson[6] came to the same conclusion. Richeri and Gomez,[15] and Wales and Madden[16] reported no significant difference of the natural or acquired immunity in diabetics to the staphylococcus. Whereas Bates and Weiss[17] recently in well controlled experiments found a slower production of alpha anti-staphylolysin in the serum of diabetics and a lower maximum titre after weeks of immunization using the staphylococcus toxin, they also observed a definite correlation between the degree of response and the state of diabetic control.

Sweet,[18] in 1903, found a marked decrease of hemolytic and bacteriolytic complement, while Horster,[11] Rockwood and Beeler,[19] and later Richardson[6] could not confirm this finding. However, Koenigsfeld[20] reported a drop of complement paralleling the rise in cholesterol in lipemia. Bayer and Form[13] noted that it was temporarily restored by administration of insulin and dextrose. Most observers, apparently, believe that the fault of this defective immunity lies primarily with the amboceptor and not with complement. Their experience however has been principally with experimentally produced diabetes and well controlled diabetics. Is it not logical to assume in the uncontrolled diabetic with a long existing pathologic state, afflicted with an infection that complement may be deficient? Undoubtedly a study of complement in the blood of such individual would prove it.

The liver is the storehouse of glycogen which may be drawn upon in time of need. The organ does not contain the entire bodily supply of glycogen, for about two-thirds of it is stored in the muscles. That in the liver, however, represents the portion easily available for use by the body. A supply of glycogen in the liver is essential for a diabetic. An adequate glycogen reserve by preventing acidosis and coma is indirectly a defensive factor; a lack of it will allow the pathologic state to develop and thus lower tissue resistance. Richardson[6] has studied the protective effect of liver glycogen per se in experimental diabetes. The ability of the experimental animal to survive after a bacterial inoculation appears to be definitely increased by the presence of larger amounts of glycogen in the liver or

by some metabolic change which accompanies this increased liver glycogen. However, he finds no significant correlation between the survival time of the animals and the glycogen of the muscle at the time of inoculation.

Inadequate carbohydrate content of the diet will result in a subnormal glycogen reserve. Rigidly controlled diabetics whose insulin dose is unnecessarily large will eventually, after prolonged treatment, be similarly affected. Occasionally in the stabilized clinic patient we encounter the latter condition and always correct it before surgery is contemplated.

Normal protein intake with the maintenance of a nitrogen balance is vital. Diets low in protein as occasionally seen in elderly diabetics too rigidly controlled will result in a state of hypoproteinemia. Diets in which the carbohydrate content is low may be as injurious because protein must be sacrificed in carbohydrate need. Protein loss may result from endogenous catabolism subsequent to chronic disease. Whatever the cause may be, a protein deficiency, although slight, will lead to hypoproteinemia. Thompson, Ravdin, et al.[21] have demonstrated the role of hypoproteinemia in the healing of wounds. Mild as it may be, at times barely detectable by chemical studies, hypoproteinemia is a most important factor in lowering the resistance of tissue to infection. Clinically we have observed this occurrence in several cases and have realized the benefits of its correction.

The role of vitamins in diabetes in general has been extensively studied, but we will mention only that related to the defense mechanism. Frazier and Ravdin[22] have studied the effect of vitamin B_1 in glycogen storage and conclude that large doses aid in the deposition in the liver. The relation of vitamin C to wound healing deserves more comment. In larger doses the beneficial effect of this vitamin is remarkable. The deficiency of vitamin C in the free clinic patient is emphasized by Holman.[23] He points out that 44 per cent of these individuals, who fall in the low income group, are on diets poor in vitamin C. Diabetics are prone to fall in the same category. Taffel and Harvey[24] claim that even mild deficiencies of cevitamic acid may be a causative factor of poor wound healing. Lanman and Ingalls[25] have experimentally confirmed this.

Therefore in the diabetic, lowered tissue resistance is dependent upon a number of interrelated factors. The increased sugar content of the blood and tissue per se are not of much significance but the dehydration and acidosis that follows cause intrinsic physical and chemical alterations between the tissue fluids and cells. These alterations undoubtedly play the primary part in the defective antigenic response. In addition, decreased liver glycogen, hypoproteinemia and vitamin C deficiency virtually punish more severely the handicapped cell. This diminished antigenic capacity explains the abnormal immunologic reactions, which are the direct causes of lowered resistance. Most observers believe that in the defective amboceptors lies the essential failure of the faulty mechanism. Complement is generally agreed to be in normal amounts. We personally feel that both are equally diminished and clinically the response to corrective therapy confirms our impression.

The clinical application of this physiologic concept of lowered tissue resistance embodies ways and means either to prevent the abnormal or to restore rapidly the normal state. Its importance is emphasized in the elective surgical patient where there is time to overcome the deficiencies by proper management of the diabetes and in the emergency surgical case where correction can be accomplished by substitution methods.

During the past decade, there has been a vast improvement in the mortality rate in diabetic surgery, especially in emergency cases. Although there has been no appreciable increase in the death rates among elective surgical cases, there is not a corresponding reduction. No doubt the urgent cases have received more careful attention.

It is an orthodox teaching that as long as the known criteria of stabilization exist, the patient is in a safety zone, with too lit-

tle realization that all these findings are no measure of the vitally important tissue resistance. Clinical observations and many reported cases reveal that in spite of apparent rigid control the postoperative course may be stormy with impending acidosis and coma, or the wounds may not heal or become infected. On the other hand, Greene, Swanson and Jacob[26] reported excellent wound healing even in the presence of the ever dreaded postoperative hyperglycemia. One can readily explain these paradoxical occurrences on the basis of this new concept. The former cases were undoubtedly inadequately prepared and their clinical laboratory findings were no indication of the existing state of resistance, whereas, in the latter group the patients apparently received prolonged preoperative care and the abnormal blood sugar was definitely not in proportion to the state of cellular resistance.

ELECTIVE OPERATIONS

In the preoperative care the value of prolonged, careful control of the elective surgical diabetic cannot be overemphasized. There is no place in this classification for the uncontrolled elective. All cases which present no urgency should be made to follow the hard and fast regulations for prolonged stabilization before surgery is contemplated. It is especially in this group of cases that preventable mortalities occur, not to mention the increased morbidity. In elective surgery, time is no element and all unstabilized diabetics, admitted for operation, are referred first to the metabolic clinic for preparation. Standard, Brandaleone and Ralli[18] have demonstrated the value of such measures. They report a mortality of 6.9 per cent among the cases referred from the diabetic clinic in contrast to a mortality of 20.8 per cent in the non-clinic group.

An elective surgical case is ready for operation only after he meets these qualifications. The weight must be within or slightly below the standard requirements for his height. He must be well fed for a prolonged interval preoperatively, the diet being adequate in carbohydrate, protein and fat, must contain essential minerals and vitamins. Additional vitamin C must be included. To insure a good glycogen reserve, a relatively high carbohydrate quota is advocated. The urine must never reveal more than a trace of sugar. With an adequate insulin dose a slight trace of sugar is more desirable as the fear of too rigid control is eliminated. Naturally he must be acid-free and maintained so.

If possible, insulin is given in one dose, using the protamine zinc type. If necessary, one additional dose of regular insulin is supplemented. The slow absorptive character of protamine zinc insulin secures a safety period before, during, and immediately after surgery. Minor individual variations are realized and naturally a fast rule in this regard cannot be affixed.

One of the principal means of eliminating acid radicals and of maintaining normal water balance is by an adequate fluid intake. The patient should drink enough fluid daily to insure an output of at least 1500 c.c. He usually gives full cooperation in this regard.

Although nothing is allowed by mouth for eight hours preceding surgery, protamine zinc insulin is given in full dosage the morning of the operation. The proteolysis of the unavoidable surgical trauma, fear, which through the adrenals stimulate hepatic glycogenolysis, and the anesthetic will cast sufficient glucose in the blood stream during that interval to compensate.

In elective surgery, preoperative medication is given as in non-diabetic; in older diabetics hypnotics and sedatives are given with more precaution.

It is evident, therefore, that long standing stabilization prior to surgery is desired in order to prevent the pathologic state regardless of the expense of time. There is no method of measuring the state of cellular resistance and experience has taught the safety of the above advice. Only by instituting such measures will the mortality rate in elective surgery of the diabetic approach that of the non-diabetic.

The postoperative care of the well prepared elective surgical diabetic presents no difficulty. The detail laboratory work is unnecessary, provided the patient was studied

in advance. Unless a long unexpected traumatic operation occurred, postoperative problems are not anticipated.

On returning to the bed a 2½ per cent glucose solution is given slowly intravenously. Four hours later a urinalysis is done. If sugar is present it will be in small amounts and no additional insulin will be indicated. Of more importance is the absence of sugar or the presence of acetone. If the former exists a rush blood glucose is done; it is usually within normal limits. If however, it should be low, additional glucose is given. A hypoglycemic reaction in the postoperative period is dreaded, especially in individuals past 45 years of age. Acidosis is rarely present to any degree, if so, additional glucose and insulin will be needed to combat it. In those cases requiring a supplementary dose of regular insulin, it is given subcutaneously at 6 p. m. and 1000 c.c. of 5 per cent glucose in normal saline is administered as a buffer.

If the patient requires parenteral feeding for a few days, the carbohydrate value of the diet is supplied by glucose infusions and the daily protein intake by either blood or plasma. Vitamin therapy is always continued immediately postoperatively by intramuscular or intravenous routes. The dose of sulfonamide is handled in a similar manner. As soon as the patient can tolerate oral feedings, the original caloric intake is given.

EMERGENCY OPERATIONS

Every surgical diabetic in which time is so important that a detailed preparation is not possible must come under this category. Consequently each case presents a separate problem and the management will vary according to the type of the lesion and the degree of existing acidosis. Furthermore, these two entities are interdependent and each one enhances the progress of the other.

In the realm of surgery there is no more perplexing task than the responsibility of a severe surgical diabetic with acidosis. This patient is dangerously ill with a cardiovascular collapse, dying a chemical death. The immediate chemical alterations must be corrected and this may be impossible in the presence of the surgical lesions. Therefore, the treatment of this condition must take into consideration: first, the immediate chemical alterations, and secondly, the state of cellular resistance. All of the drastic measures available to rid the body of acid and to restore fluids and electrolytes are used. In the past as soon as the condition would permit, under spinal or intravenous anesthesia, the process was removed or its toxins diverted. With the advent of refrigerations and tourniquet, as suggested by Allen,[28] the deleterious effects of the surgical lesion are limited immediately or may be virtually removed.

Regardless of the type of emergency, all exhibit a lowered cellular resistance. As time will not permit the benefits of a prolonged stabilization, the administration of blood to replenish the needed protein and to restore the deficient complement will give additional support. Specific antitoxins, if available, stock vaccine or non-specific vaccine, and parenteral vitamins are of inestimable value.

The sulfonamide group of drugs have contributed greatly to success in these cases. They are, however, depressive to the defensive mechanism of the body as emphasized by Kneeland and Mulliken.[27] Being primarily bacteriostatic, which is of course welcome, they also tend to retard some of the function of cellular structure which adds insult to injury. Therefore, substitution or stimulative therapy is advocated to compensate for this interference.

Among the many emergencies the most common are the lesions occurring in the lower extremities and the carbuncles. It is realized that the blood supply of the lower extremity is diminished in all elderly individuals. In the diabetic this diminution may occur earlier in life but it is not necessarily greater. Nevertheless, it is a known fact that infection is more difficult to control and the consequences are greater in the diabetic. This relative difference is dependent upon lowered tissue resistance as explained in the concept and not the deficient blood supply as so frequently emphasized. The carbuncle, not affected by this factor,

better exemplifies the value of the proposed therapy.

The carbuncle is a serious lesion in the diabetic. Its presence always indicates a lowered state of tissue resistance. In the diabetic prophylaxis has justly received much attention. Brigham's statement, which Joslin[1d] has popularized, "the washed neck like the watched pot never boils" emphasizes that scrupulous cleanliness is very essential. However, the avoidance of trauma and the maintenance of tissue resistance by careful stabilization are of equal importance.

There still remains much controversy as to the ideal treatment. We have been particularly impressed with the results obtained by devoting primary attention to systemic defenses. Naturally the control of diabetes is foremost but we are as energetic in rapidly building the defense mechanism. Since these infections are usually caused by staphylococcus both the vaccine (toxoid) and the antitoxin are given. The latter neutralizes the circulating and necrotizing toxins, while the former stimulates the antigenic capacity. Unmodified blood as a transfusion will replace complement and replenish the protein content. Vitamins B and C are given in large quantities to encourage glycogen storage in the liver and to promote cellular nutrition respectively. Sulfadiazine in full dosage is given, using the usual precautions of sulfonamide therapy.

The treatment of the carbuncle per se consists of dry heat initially until proteolysis is complete, thus forming a fluctuant mass which is then drained. The infrared lamp is preferred because of its deep penetration with the production of a marked hyperemia. One must guard against burning. The ease of application allows frequent treatments. Dry heat maintains the integrity of the skin while moist heat injures the overlying integument before proteolysis is adequate. When fluctuation indicates sufficient lysis of the involved tissues, the skin is protected with "vinylite resin"[29] and a small stab incision made to drain the purulent exudate. Twice daily this cavity is irrigated with azochloramid solution until clean. Healing occurs rapidly with absolutely no loss of skin.

This seems to be the ideal treatment and although we may appear over-enthusiastic our results indicate the value. It is necessary that every detail be fulfilled in toto and that the lesion be carefully followed. Many of these factors which are used here have been tried separately but to the best of our knowledge and as far as the literature will support us, the results following the complete physiologic correction of all of the disturbances have not been reported.

SUMMARY

1. A defective immunologic mechanism, subsequent to physical and chemical alterations of the tissue fluids and cells is the primary factor concerned.

2. Inadequate glycogen reserve, hypoproteinemia and vitamin C deficiency virtually punish more severely the handicapped cell.

3. The clinical application of this concept refers to the treatment of both the elective and the emergency cases.

4. In the elective case, time is not important and complete restoration following prolonged stabilization is possible.

5. In the emergency case time is most important; therefore, supportive, substitution, and stimulative therapy is essential.

6. The management of carbuncles in the diabetic is discussed.

7. A comparative statistical study of mortalities is presented.

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DISCUSSION

Dr. Howard I. Mahorner (New Orleans): I feel grateful to Dr. Charbonnet and Dr. Schroeder for calling attention to the various factors essential to the successful management of certain diabetics.

Perhaps the ischemia factor has been given too much prominence as the cause of a lesion in the lower extremity in diabetes. To evaluate this factor carefully is difficult and is important as far as the patient's future is concerned. Because a patient has a lesion on the lower extremity and one associated with diabetes is no indication that that patient must have a radical operation. On the other hand, if radical operation is necessary withholding it invites further trouble and possible death. The question of evaluating the ischemia factor is one for which we have no absolutely accurate method of precision. Today clinical experience more than anything else will tell whether an operation should or should not be performed, and if necessary its extent. On the other hand there are certain helpful measures; for example arteriograms are made relatively safe now and in doubtful cases may have some value. The usefulness of instruments of precision such as the oscillometer and thermocouple has probably been over-rated.

To obviate the futility of useless conservatism in these cases is a very important thing. In other words it is useless to get the person over a lesion that he has at that particular time and have him nurse that leg, hoping for relief for a long period of time and six months or a year later, never having been entirely well, come to amputation. That particular problem is present in all vascular diseases and one which is difficult to determine exactly.

Conservation in surgery for furuncles and carbuncles is certainly very interesting and additional evidence that as far as inflammatory surgical risks are concerned the advent of immunotherapy and chemotherapy is mitigating the extent of the radicalness of surgery. This is not only true with these lesions but for many other conditions, for example, as acute hemotogenous osteomyelitis.

I would like to ask Dr. Charbonnet two questions. What has he found to be the effect of sulfonamides on diabetes, if any; and do sulfonamides respond differently in diabetes, or does diabetes have an effect on their action?

Dr. J. O. Weilbaecher, Jr. (New Orleans): It

is obvious that Dr. Charbonnet and Dr. Schroeder have presented a conclusive study of this problem. It is further obvious that because of their low mortality figures—the lowest reported—it is proved that their method of handling these cases has been highly successful. From a medical standpoint, I think one factor should be emphasized These men have repeatedly pointed out that the dietary management of patients is at least one controllable factor that leads to acute illness of these patients. It is generally conceded, I think, that the average man handling diabetic patients usually puts patients on the lowest diet he can in order to get the lowest insulin dosage as possible. In so doing he takes the responsibility of seeing that the patient has sufficient amount of vitamins, minerals, carbohydrates, protein and fats. The best method, it would seem to me, would be to have the patient in the best possible condition for surgical procedure to prevent complications. Dr. Lucas, of Boston, thinks diabetics are handled better on maximum procedure; high insulin dosage so that patients can be given higher diet. The majority of diabetics are given insulin on a borderline diet most of the time and it is not surprising that dietary deficiency is the result. This is a most important thing in handling these patients.

Dr. Alton Ochsner (New Orleans): The important part of this presentation, it seems to me, is placing of treatment of surgical diabetics on a physiologic basis. For the first time I know of, it has been possible to treat these patients from a fundamental standpoint. Heretofore more or less all of us have directed attention toward the lesion itself without appreciating that in addition to the diabetes there are other changes which affect the patient.

The results which Dr. Charbonnet and Dr. Schroeder have gotten speak for themselves. By the institution of these physiologic methods which are simple, and treating patients as individuals with disturbed physiology, these patients can be treated just the same as non-diabetics.

Dr. L. Sidney Charbonnet, Jr. (in closing): We have taken more time than was alloted us. In answer to Dr. Mahorner's question we know of no specific effect of sulfanilamide on diabetes itself. But, as we have emphasized, the sulfonamides are depressive to the immune mechanism, which is already subnormal in the diabetic. Consequently, when this drug is given, the antigenic response of the cells must be stimulated or immune bodies supplemented by sera.

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IMPRESSIONS OF VENEZUELA

VERA MOREL
NEW ORLEANS

Editorial Note: Doctors H. W. Kostmayer, Alton Ochsner, and W. A. Sodeman visited Venezuela recently in the interest of cementing cordial and closer relationships between the medical professions of Latin America and of the United States. As guests of the Standard Oil Company, they were accompanied by Doctors Alfred Gage and Kenneth R. Foucher. The object was to determine where exchange students could best fit into the curriculum of the medical schools in Venezuela and in New Orleans. The tangible result of this visit was the granting of two scholarships by the Standard Oil Company to Venezuelan youths to attend Tulane School of Medicine with a year of pre-medical study in New Orleans.

The following impressions of Venezuela and her remarkable achievements in education, sanitation and hospitalization have been recorded by Miss Morel from information obtained from the doctors visiting Venezuela, with the idea that members of the Louisiana State Medical Society may find interest in the highlights of a fascinating trip.

Flight from Miami to Maracaibo is made in less than one day by Pan-American clipper, flying over lumionus blue waters and tropic isles to the surf-streaked shores of South America, the mythical Spanish Main. History lessons are recalled. This very coast was the first land sighted by Columbus upon his third voyage when he explored the delta of the great Orinoco and sailed into the Gulf of Paria. The following year, 1499, the Spanish explorer, Alonzo de Ojeda, venturing farther westward, came upon the Gulf of Maracaibo where he found a settlement of huts built over the water and native Indians paddling about in dugouts. So like Venice, he thought, and promptly named the gulf and the land "little Venice" or Venezuela, a country covering 352,051 square miles, rich in oil and orchids, copper and coffee, mineral and agricultural resources and good neighborliness. The population is approaching four million.

At Maracaibo, a modern industrial city created in low land surrounded by jungle, the visiting doctors were received by Dr. Alfonso Bortone and Mr. A. T. Proudfit. Oil derricks everywhere, fifty miles of them along the coast, and countless numbers "growing" in the waters of Lake Maracaibo

like a forest of straight, branchless trees. This fertile basin has proved an El Dorado of reality—a kingdom of "black gold" pouring its wealth from the earth to make Venezuela the third largest oil-producing country in the world.

The Lago Petroleum Company's plant is remarkably interesting—innumerable rows of derricks, narrow wooden walks connecting the low rows, barges, cranes, puffing engines, pile drivers, giant warehouses, machine shops, nearby tank farms, everything pitched to an incredible mammoth and expensive scale; wells being drilled under water at a depth of 140 feet, each costing approximately $180,000.00. A cement pile weighing 40 tons is braced by additional concrete blocks and piles, the whole surmounted on a steel base where the derrick is fixed and pile driving begun. A fabulous amount of capital has been invested in exploring this rich western field, the development of which began about 14 years ago. At Lake Salina, the company's "oil camp" has a model emergency clinic, staffed by four doctors to care for the sick and injured. The Caribbean Hospital also provides for the oil companies' workers.

A magnificent $750,000 hospital at Maracaibo has recently been completed by the Lago Company for the Government. The structure is perfection in plan and equipment, even to sponge rubber mattresses. Air-conditioned operating rooms are on the top floor. While yet unopened, it is hoped that this splendid hospital soon may be utilized for surgical and obstetrical cases where the hospitalization period is not so long or so costly as required by medical cases, chronic malaria ones predominating.

Sanitation and hospital facilities at Maracaibo were an index to Venezuela's ambitious pattern of public health and social welfare. While General Juan Vincente Gomez budgeted $80,000,000 for the physical improvement of the country which he ruled for 25 years, concerted effort to control the diseases of this tropical climate and to improve living and working conditions coincides with the exploration and the development of the petroleum industry, although hospitals in Venezuela date to the year 1590 and a medical school existed as early as 1721, higher education in South America pre-dated that of the United States.

The flight eastward to LaGuaira gives a panorama of varied scenery—rugged coastline fringed with islands, towering cordilleras and foothills, rivers and lagoons, dense forests, high plateau, grassy llanos, and valleys. The picturesque harbor of LaGuaira is both airport and sea outlet for Caracas, Venezuela's capital, just seven airline miles away. However, to reach Caracas, 23 twisting miles must be traversed, ascending the Sierra Nevada range and then slowly dropping to the high valley where the tile-roofed city lies, 2,500 feet above sea level, delightfully cool. The concrete highway, finished in 1926, parallels an electric railway and the ancient foot and horse trail, and leaves Caracas to join the Trans-Andean highway that leads over mountains as high as 14,000 feet to the border of Colombia, and then to Bogota. Caracas, cultural and educational center, is the birthplace of Simon Bolivar (1783-1830) whose tomb is now a shrine in the National Pantheon, formerly a Spanish cathedral. Venezuela owes her freedom from the rule of Spain to this great revolutionist and liberator whose ideals often have been likened to those of George Washington.

Eminent medical men of Caracas who received the New Orleans visitors and accorded them many courtesies and honors, both social and professional, were: Dr. José M. Espina, President of the Academy of Medicine; Dr. Herman deLasCasas, Dean of the Medical School of Central University; Dr. Antonio J. Castillo, Director of the University; Dr. Eugene P. deBellard, prominent surgeon, graduate of Tulane School of Medicine, and Chairman of the Venezuelan Section of the International Surgical Society; Dr. Francis P. Corrigan, American ambassador and surgeon; Dr. Hermanoges Rivera, Director of La Vargus Hospital; and from the Standard Oil Company, its president, Mr. Henry Linam, Drs. Victor Brito and Jose D. Leonardi.

Of particular interest was the weekly

meeting of the Academy of Medicine at Caracas, and the extraordinary session of this august body held the following afternoon in honor of the visitors who were invited also to the formal induction of the Juncta Directiva, newly elected officers of the Academy. The occasion was a Sunday morning reception, formal and impressive, held in the auditorium of the University which was formerly the chapel of the monastery and retains many of the original fixtures. Many of the medical men of Venezuela are active in civic affairs. All seemed to recognize the importance of Pan-Americanism in the medical as well as the cultural and economic field, and to sense the present need for interchange of ideas and mutual understanding of public health and social welfare problems that today are as vital to North and South America as is their political unity.

Central University (Universidad Central), now over 200 years old, is closely allied with the medical institutions of Caracas, in which city there are five hospitals with 100 beds or over, averaging about six beds per 1000 inhabitants. The proceeds from the lotteries at Caracas have financed many institutions in the Federal District and made grants to other states. La Vargus, the charity hospital of Caracas, preserves the memory of José Maria Vargus, the first great surgeon of Venezuela who became the president of this country. Born in 1786, educated at Cambridge University, this brilliant scholar and scientist, came to join his friend, Bolivar, in Venezuela, where he reorganized the medical schools and instituted a program of scientific research. LaVargus Hospital has been remodeled and presents a picture of spotless wards and surroundings. Medical practice in Caracas is divided into two extremes: there are excellent provisions for the poor and for the wealthy. Apparently the moderate income group is unaccommodated. There are about 200 beds available for private patients and these beds usually are used for surgical cases. There are a number of small clinics and offices with one or two beds.

As a part of La Vargus' activities, the Institute of Traumatology, headed by Dr. deLasCasas, has two wards of 30 beds each, for male and female patients, and service is solely for the traumatic and orthopedic cases. Photography is extensively used by Dr. deLasCasas who possesses 500 complete films of operations, and the operating room is equipped for taking motion pictures, a nurse having been trained for this work. Records of the hospital are preserved in bound volumes, complete with photographs of patients, of pathologic specimens, and x-ray films.

The nursing situation of Venezuela has been acute because of the fact that the educated girls of the country considered this work to be a demeaning task, but the need has become so great that several institutions now are established for nursing education. The Institute of Nurses at Caracas, housed in a building of Spanish architecture, is under the direction of a Spanish nurse who was trained in the United States.

The Maternity Hospital, with 160 beds, is directed by the State and presents a fine example of modern provisions for expectant mothers. There are radio-equipped ambulances, automatically-controlled elevators, beautiful operating and delivery rooms. The Clinical Hospital near the University is an impressive structure with 360 beds, modern laboratories, operating rooms, departments for research and student demonstrations. Many of the solid old structures of fireproof construction and with tile floors have been adapted for use as public institutions and private dwellings. The first modern sanitary unit of Venezuela was the house in which Bolivar lived, and the beautiful home of Dr. Corrigan was once occupied by the son of Gomez.

The increase in the number of medical students has caused crowded conditions in the Institute for Experimental Medicine and Surgery, a fact lamented by Dr. deLas Casas, its director, but the routine of teaching evidently has not encroached upon the important research projects in progress. A noticeable feature was the manner of maintaining the animal supply. Three large cages, each containing from 30 to 50 dogs, were used for keeping the animals in quar-

antine for varying periods so that, when ready for experimental use, they are in suitable condition. Scientific talks given by the Tulane doctors were eagerly received by the faculty and students of this institution which in turn contributed much of interest to the visitors.

The Antituberculosis Hospital, of which there is a counterpart at Merida, is six miles from Caracas, a costly building planned for the most modern care of a large number of patients, but at present uncrowded because of the policy to care particularly for surgical cases and later to admit only those in which some form of collapse therapy is practical. A tomograph is used in this institution. In the tuberculosis receiving hospital in the city, free treatment and free medicines are given to the poor. Adults and children are cared for in separate sections. In Caracas there are a children's hospital, a psychiatric hospital, an institute for cancer, and a Red Cross hospital.

Caripito lies in eastern Venezuela, a few miles from Quiriquire on the Rio Don Juan, which is an outlet to the Caribbean. The oil camp is 26 kilometers from the airport and the guest house of the camp three miles from the wharf where barges receive the oil. The river may be reached in a Ford on railroad tracks through dense jungle that makes one aware of the almost overpowering beauty of tropical forests, as well as of the tremendous task, even hardships endured, that this trail might be opened and kept open. Here was witnessed the carving of an oil field, a port, and a city, out of prairie and forests—an achievement that approached a marvel. Mr. J. A. Clark, Dr. Erito, and Dr. Bulmer, medical administrator of the company, served as hosts and guides. Impressive is the modern aspect of Caripito with its oiled roads and streamlined houses. Some 70 miles away in another camp the homes were constructed of hollow tile made by the oil company. There a dispensary was under construction. Another camp is the site of the original hospital, of wooden frame, now used as a temporary structure. The surgeons of the group were invited to operate at the Caripito hospital and later at the General Hospital in Maracaibo.

Opportunity to enjoy the social and home life of Venezuela was provided. Entertainment is usually in the homes or clubs, seldom in crowds. For sports, there are horse racing, two bull rings, American baseball, and the national game of the people, bolas, derived from the ancient game of bowls, and played usually on the country roads. The Caracas Country Club has been erected on the site of a famous hacienda and is exceedingly attractive with low red-tiled roofs, abundance of mango trees, an 18 hole golf course and beautifully landscaped grounds. On the mountain slope near the Club are the homes of the Linams and the deBellards. Mrs. deBellard is of the noble Ybarra family, and represents the gracious and charming hostesses of Venezuela. She is president of the Venezuelan Red Cross. Mr. Linam possesses a medallion presented him by General Gomez for his services in Venezuela.

Only a poet or a painter could describe the natural beauty of this rich country, the greens of her tropical forests, wonderfully pictured in Hudson's immortal "Green Mansions"; the color of her flamboyant trees, acacias, mimosas, bougainvillea, bananas, and from the mountains tall-stemmed calla lilies, and orchids of many varieties.

Departing from Venezuela, the visitors carried many impressions of a good neighbor from whose historic background of art and culture there is much that is inspiring and whose present preoccupation in a humanitarian program furnishes lessons from which we may profit. There is convincing evidence everywhere of an earnest desire for closer relations between North and South America. If there could be found as many North Americans speaking the Spanish language as there are South Americans speaking English, a serious barrier would have been removed. Visits such as this may not show an immediate and measurable result, but often repeated, they will greatly help in creating that hemispheric solidarity which means so much to all peoples on both sides of the equator.

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DEMAND FOR DOCTORS

Now that the Charity Hospital has been straightened out, it will be possible for that institution to aid directly and indirectly in supplying physicians for the various services for which they are needed so badly. Directly the hospital is training a large number of interns and residents. Indirectly through the facilities of this institution the two Louisiana medical schools, that of Louisiana State University and Tulane, are training in their clinical years a larger group of students than has been their custom in the past, this because of the demand for physicians. At the request of the armed forces and of Procurement and Assignment Service of the social security division of the Government, medical schools have accelerated their courses and have accepted 10 per cent more students than is their custom.

As has been accentuated in the past, Washington authorities are particularly anxious to have this yearly accretion to the medical services of the Army and Navy for war purposes. In order to train these men it is necessary to have teachers. Indicative of the feeling that the maintenance of an adequate faculty in a medical school is a necessary service to the country is a recent editorial in the Journal of the American Medical Association in which it is written that "Medical teachers who are essential to the conduct of the medical school must appreciate their responsibility to continue in their teaching positions. Furthermore, they should realize that by so doing they are making a great contribution to the war effort in the education of this unprecedented number of physicians, which is necessary to the continued conduct of the war. In many instances they will be called on to carry a much heavier routine and to make greater sacrifices as teachers than they would as commissioned officers in the military services. Enthusiasm for service, local attitudes and social pressure have already resulted in serious depletion of the medical school faculties in a few instances." Particularly to be noted is the last sentence of this paragraph because much pressure has been brought on many of the younger men who have been detained in the medical schools as teachers or who are residents in a hospital and who have been deemed "essential" to get these young men to go into the armed services. There are but a few of them and their duty lies at home rather than in combat work.

Every practicing physician realizes that there is and will be a great demand for doctors in civil communities. It has been estimated that the minimum should be one physician for every 1500 civilians but these

figures cannot be accepted as final. It is obvious in a thickly settled community fewer doctors can take care of many more people than is possible in the rural communities. Unlike the cities of the far South, the urban physicians in the North have not responded as they should to the call of duty. New York City, with over 16,000 physicians, is reported to have sent only slightly over 1000 doctors into the Army. The Army needs these men although there are some people who question the actual need of six and a half to ten doctors to every 1000 men. If those who know and who are considered as authority on the subject feel that that is the number of doctors who should be in the armed forces no complaint should be made. After all we are in war and a very real war. Since Pearl Harbor nearly 5000 American soldiers have died, over 3000 have been wounded and more than 36,000 are prisoners, missing or killed in action without definite knowledge that this is the case. These figures seem large but during the same period of time 30,000 American workers have died an accidental death and 2,225,000 have had minor to severe injuries in industry. There is need to accelerate the program for medical services to industry. The armed services, medical education and hospital services may have been provided for to a certain extent at least, by Procurement and Assignment but war industries are calling for physicians and make claim for services of many more doctors than they have now, basing their demands on the figures just quoted. It is obvious that civilian service, war service, industrial service and educational service are not going to be provided with the number of doctors that each service feels it should have. But they may feel assured that the medical profession will do its very best and try to spread itself as wisely and as widely as possible and to do its best.

PREVENTIVE MEDICINE

The medical profession is proud of what has been accomplished in the last comparatively few decades in the control of sickness and disease and in the prolongation of life that has resulted because of certain measures of what may be termed a prophylactic nature. It should not be overlooked that preventive medicine is important chiefly in the early years of life and that the mortality rates of people who have attained the age of 40 show very little improvement or diminution. While the physician points with pride to these accomplishments, it must not be forgotten that busy practitioners are by no means always practicing preventive medicine. As a matter of fact, often they are rather lax in their efforts to prevent disease. Some ten years ago the professor of medicine at Vanderbilt University urged that the private practitioner throw greater effort into the curbing of syphilis or otherwise the problem would have to be taken up by the Government, and it has been.

The average medical man depends on his state or local health departments to maintain a continuous supply of pure water, of clean milk and of pure food. He expects the state agencies to take care of communicable disease problems, in fact to such an extent does he depend upon them that often he fails to report one or another of the reportable diseases that occur in his practice. The practitioner frequently permits semi-lay organizations to conduct campaigns against tuberculosis, against cancer or against poliomyelitis. Maternal mortality has been appallingly high in the United States and it has been only in the last ten years that maternal mortality has begun to show an outstandingly downward trend. The doctor must face the fact that the state and local public health services for maternal health through the provisions of the Social Security Act have played a most important role in this maternal mortality decline but where the doctor has gotten behind this large problem the results through the influence and action of physicians maternal mortality fell from 7.5 per 1000 to 2.4 in 1940.

These observations represent a plea to the medical profession to cooperate with their local and state health service. The

demands on the physician's time have been great and will be greater than ever in the next few years. It has not always been possible for the doctor to give his time and attention to the subject of preventive medicine but now more than any other time when thousands of physicians are in the Army and Navy every medical man has as one of his primary duties and responsibilities, irrespective of how busy he is, the helping to maintain high standards in the prevention and correction of illness and disability so that our civilian population can give a healthy, whole-hearted effort to the winning the war.

DEHYDRATION IN INFANCY

The average clinician is well aware of the fact that in many pathologic states dehydration occasions symptoms which are occasionally overlooked. Not so much at the present day does this statement hold true because glucose solution and salt solution have become almost a routine in the treatment of many conditions, notably those associated with fever. That the sick adult needs fluids is quite well recognized but many are the babies who have died as result of lack of water. There are several reasons for this, but two stand out; one being the difficulty of administering fluids to very small children and the other is their administration in quantities insufficient to meet the requirements of a very young child, which requirements are proportionately much greater than in the older child and the adult.

Stewart* points out that fluids are of prime importance not only in dehydration but also in alkalosis and in acidosis. The child who has severe vomiting loses much hydrochloric acid and consequently as result of the loss of the strong acid ions there is a compensatory increase in the plasma bicarbonate resulting in alkalosis, which condition can be diagnosed readily by appropriate laboratory studies. The clinician should be able to recognize alkalosis because of the slow and shallow respirations and the generalized increase in muscle tonicity associated sometimes with actual tetany and convulsions. To these children Stewart recommends the intravenous injection of 10 c. c. of 10 per cent solution of calcium gluconate per kilo of body weight. Inhalations of carbon dioxide are temporarily valuable in relieving the convulsions. If carbon dioxide is not available a paper bag held over the face of the child will result in the bag being filled with carbon dioxide of relatively high content which may be breathed and rebreathed.

An infant who has prolonged severe diarrhea not only is depleted of body fluids but also of base, and acidosis develops. The acidotic child, when the acidosis is pronounced, will have deep pauseless respirations and stupor. The urine is intensely acid. To these children the author recommends the administration of 60 c. c. of dilute 1/6 molar sodium-r-lactate solution per kilo of body weight. In the premature babies, even larger amounts of the solution should be given. He recommends giving one-third to one-half of the required solution intravenously and the remainder given subcutaneously or intraperitoneally, in order to replenish the depleted source of body water and alkali and to restore glucose and liver glycogen.

Clinical dehydration expresses itself when fluid loss is equivalent to 6 per cent of body weight. A sufficient amount of fluid should be given immediately to rehydrate the infant. To a child under two years of age then 30 c. c. per pound of weight should be given immediately and at least 60 c. c. additionally during the 24 hour period. Proportionately this is one-third more than needs to be given to older children. The fluid may be given by hypodermoclysis or intraperitoneally or intravenously. The dehydrated child will absorb 30-40 c. c. per pound when the fluid is given under the skin. When given into the peritoneum it can be given more rapidly, in ten to twenty minutes and is rapidly absorbed. In early infancy the needle should be inserted through the left rectus muscle; in slightly older children, in the midline

*Stewart, Chester A.: The administration of fluids to children, Texas State J. M., 38:332, 1942.

immediately below the umbilicus. The intraperitoneal route for the administration of fluids is an excellent one with practically no contraindications. Once in a while marked distention of the abdomen or severe dyspnea, the presence of a peritonitis or adhesions would contraindicate this method of approach but except for the distention the other conditions are rare. Intravenous injections are difficult but satisfactory veins may be seen in the superficial scalp, in the intercubital fossa, in the back of the hand or even the external jugular may be used. The author advises giving not more than 6 per cent of the body weight and allowing the fluid to go in at the rate of 5-10 c. c. per minute. He cautions against transfusing by way of the superior sagittal sinus.

Many an adult and many a child has died a chemical death. These deaths for the most part can be obviated and prevented by the administration of water, probably the most important curative substance known to the medical profession. A well known clinician is reported to have said that if he were to have only one medicament to be employed in the treatment of diabetic acidosis and coma he could select water as being the most useful.

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TRANSACTIONS OF ORLEANS PARISH MEDICAL SOCIETY

OCTOBER CALENDAR OF MEETINGS

October 1. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.
Baptist Hospital, Executive Meeting, 8 p. m.

October 5. Orleans Parish Medical Society Board of Directors, 8 p. m.

October 6. Eye, Ear, Nose and Throat Staff, 8 p. m.

October 7. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Hutchinson Memorial Clinic Staff, 8 p. m.
Mercy Hospital Staff, 8 p. m.

October 8. New Orleans Hospital Council.

October 12. Scientific and Third Quarterly Executive Meeting, Orleans Parish Medical Society, 8 p m.

October 14. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Touro Infirmary Staff, 8 p. m.
Women's Auxiliary, Orleans Parish Medical Society, Orleans Club, 3 p. m.

October 15. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

October 16. I. C. R. R. Hospital Staff, 12:30 p. m.

October 19. Hotel Dieu Staff, 8 p. m.
Clinico-pathologic Conference, Baptist Hospital, 8 p. m.

October 20. Charity Hospital Medical Staff, 8 p. m.

October 21. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Charity Hospital Surgical Staff, 8 p. m.
Clinico-pathologic Conference, Hotel Dieu, 8:15 p. m.

October 22. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m. DePaul Sanitarium Staff, 8 p. m.

October 27. Baptist Hospital Staff, 8 p. m.

October 28. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
French Hospital Staff, 8 p. m.
Catholic Physicians' Guild, 8 p. m.

October 29. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

October 30. L. S. U. Faculty Club, 8 p. m.
New Orleans Hospital Dispensary for Women and Children Staff, 8 p. m.

NEWS ITEMS

Dr. Charles J. Bloom taught at the last session of the Southern Pediatric Seminar at Saluda, N. C.

Dr. Charles J. Bloom recently presented a paper on Immunization at a meeting of the Greenville Medical Society, Greenville, S. C.

Dr. Lucien A. LeDoux recently attended an executive meeting of the council of the Southern Medical Association in Richmond, Va.

During the past month sixteen members were placed on the military rolls. They are as follows: Vincent P. Blandino, Henry G. Butker, Joseph Cohen, Mervin E. Fatter, Attilio V. Filizola, George M. Genet, Edwin R. Guidry, W. Robyn Hardy, William H. Harris, Jr., M. M. Hattaway, Arthur Kellnor, J. Durel Landry, M. L. Stadiem, Theo. L. L. Soniat, Charles J. Wheeler and Roy O. Yeatts.

During the month of September the following physicians were elected to membership:

Active Membership—Louis J. Gehbauer, Jr.

Associate Membership—Reynold Patzer.

The membership of the Society at the present time is 658, of whom 494 are active members.

Edwin L. Zander, M. D.,
Secretary.

LOUISIANA STATE MEDICAL SOCIETY NEWS

CALENDAR

PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

Society	Date	Place
East Baton Rouge	Second Wednesday of every month	Baton Rouge
Morehouse	Second Tuesday of every month	Bastrop
Orleans	Second Monday of every month	New Orleans
Ouachita	First Thursday of every month	Monroe
Rapides	First Monday of every month	Alexandria
Sabine	First Wednesday of every month	
Second District	Third Thursday of every month	

ANNUAL TULANE CLINICS DEFERRED

On account of the exigencies of war, it has been decided to discontinue, probably for the duration of the war, the annual Tulane clinic. A very large number of the personnel of Tulane Medical School faculty has gone into active service. In the catalog, the Department of Medicine, for example, has 23 members of the staff listed as being on leave and in active service in the armed forces; in the Department of Obstetrics nearly 50 per cent of the men, and in the Department of Gynecology the same holds true. Aside from the depletion of the staff, it is felt that of the Tulane graduates who have attended this yearly homecoming in the past, many are now in active service and those who are not are so submerged with work that it would be impossible for them to emerge in order to spend a week away from their practice. It is felt that all efforts should be directed toward the winning of the war, whether directly through active service, or indirectly through the large numbers of calls that are made on the men not in service to help in war activities.

SOUTHERN TUBERCULOSIS CONFERENCE

The annual conference of this organization will be held at the Peabody Hotel, Memphis, November 5-7. Appearing on the program will be Dr. Julius L. Wilson of New Orleans, who will speak on the subject of tuberculosis in war time. The only other Louisianian on the program is Rev. Frank S. Persons of Bastrop, who will participate in a symposium on volunteer workers.

UNITED STATES PUBLIC HEALTH SERVICE

Assistant Surgeons Richard A. Flebbe, Carl C. Kuehn, Andrew P. Sackett, and Bernard H. Raymond have been ordered to New Orleans for duty, the first three to report to the State Health Department of New Orleans, the latter to the Maritime Service Enrolling Station. Assistant Surgeon James M. Hundley has been relieved from duty in New Orleans and sent to California, and Past Assistant Surgeon L. L. Stokes has been ordered from New Orleans to McMinnville, Tenn.

Dr. George Mayer lectured on "Pregnancy Complicating Fibroids" at the Monroe Charity Hospital on September 14.

Dr. Nathan H. Polmer participated in the instruction seminar of the American Congress of Physical Therapy, held at Pittsburgh, September 9-12.

Dr. Polmer was reappointed on the Board of the American Registry of Physical Therapy Technicians for a term of seven years.

MEDICAL LIBRARY ASSOCIATION

The Medical Library Association held its forty-fourth annual meeting in New Orleans, La. Headquarters were at the Jung Hotel and the sessions met in the Auditorium of the New Hutchinson Memorial, Tulane University of Louisiana School of Medicine. Officers elected for the coming year are: Mary Louise Marshall (Tulane University),

President; Dr. John F. Fulton (Yale University), Vice-President; Frida Pliefke (Mayo Clinic), Secretary; and Bertha B. Hallam (University of Oregon), Treasurer. The Program featured a Symposium on Tropical Medicine, Medicine in the South, and the Medical Library in the War Program. Selection of the place for the 1943 meeting has not yet been made.

AMERICAN BOARD OF OPHTHALMOLOGY

Because of the War Emergency, the Board announces the following additional examinations:

New York City—December 13-16.

Los Angeles—January 15-16.

OFFICE OF CIVILIAN DEFENSE

Washington, D. C.

To: Regional Medical Officers.

From: Chief Medical Officer.

Subject Conservation of dealers' stocks of medical and surgical supplies:

The following statement should be forwarded to State Chiefs of Emergency Medical Service with a request that they transmit it to local chiefs of Emergency Medical Service and to hospitals and State and local Medical Societies:

The medical profession and the hospitals of the nation will shortly be obliged to depend upon dealers' stocks of medical and hospital supplies if they are to maintain their present level of efficiency. The continued shortage of raw materials makes it increasingly evident that even the armed forces may have difficulty in securing their requirements. Stocks on the shelves of the dealers of this nation constitute the only reserve of medical and hospital equipment which may be available in the near future to meet civilian needs. The hoarding and dead storage of equipment and supplies for a possible emergency should, therefore, be discouraged. Any unexpected emergency could be met by our present civilian medical and hospital resources; continued disaster could only be met by the utilization of military stores which would be made available if there were urgent need.

Any surplus or obsolete equipment now in the possession of physicians and hospitals ought not to be dispersed at this time, because of the difficulty of replacement and the possibility that it may be needed for the establishment of emergency base hospitals.

PEPTIC ULCER FILM AVAILABLE

There is now available for free showings before groups of physicians the first complete movie film on peptic ulcer, in color and with sound track.

The film is entitled "Peptic Ulcer" and was produced under the direction of the Department of Gastroenterology of the Lahey Clinic of Boston. The American College of Surgeons has awarded its seal of approval to the film.

Running time of the film is 45 minutes, 1600 feet of 16 mm. film, and covers a presentation of the following problems of peptic ulcer: Pathogenesis, diagnosis, treatment, pathology, complications, including obstruction, hemorrhage, and perforation, gastric ulcer, surgery and jejunal ulcer.

Arrangements for a showing of the film may be made by writing to the Professional Service Department of John Wyeth and Brother, Inc., Philadelphia, who will provide projection equipment, screen, film, and operator for medical groups, without charge.

CINCHONA AND CINCHONA ALKALOIDS FOR THE TREATMENT OF MALARIA

We are now in receipt of a report from the National Research Council in which it states that a preparation of one or more of the crystallizable cinchona alkaloids (quinine, quinidine, cinchonine, cinchonidine) for the treatment of malaria should provide daily for 7 consecutive days, for adults, at least 20 grains of the alkaloid or alkaloids.

The minimum amounts of these alkaloids which should be provided daily for the same period for children are as follows:

Age	Grains
Under 1 year	2½
1 to 2 years	5
3 to 4 years	7½
5 to 6 years	10
7 to 8 years	12½
9 to 10 years	15
11 to 12 years	17½
13 years and over	20

It is the understanding of this Administration that the reference to "Cinchona Alkaloids" includes the commonly used salts of these alkaloids.

The Council states that in making this recommendation it recognized that 20 grains of the cinchona alkaloids a day do not provide the optimum dose for adults—which should be 30 grains—but that the minimum of 20 grains is specified as a compromise to provide for an effective dose and to conserve the stocks of these alkaloids during the war period.

The Council has expressed the opinion also that the chinchona alkaloids are not effective in the prophylaxis of malaria.

In its enforcement program the Food and Drug Administration will be guided by this authoritative expression of opinion and will regard as misbranded preparations of cinchona alkaloids offered for the treatment of malaria which, when consumed in accordance with the directions in their labelings, provide less than the dosage specified above.

The Administration heretofore has expressed the opinion—and takes this occasion to emphasize it—that directions for use, to be adequate, should include instructions to repeat the treatment if a relapse occurs.

It has been noted that cinchona alkaloids and preparations of them are sometimes marketed in packages which do not contain amounts of the active principles sufficient to constitute a complete treatment in accordance with the above-mentioned schedule. Consideration should be given to the possibility of deception, in violation of the Federal Food, Drug, and Cosmetic Act, resulting from the sale of a package labeled to indicate that it contains a treatment for malaria, if the amount of medication supplied in the package is insufficient for that purpose.

Some preparations of the cinchona alkaloids offered as malaria medicines contain active amounts of cathartic drugs. There appears to be no rational basis for such a combination. Some patients suffering with malaria may not need a cathartic. Those who may need such additional medication should base the dosage upon the need for it; in other words, the amount of the cathartic administered should not depend upon the need for cinchona alkaloids. There is no objection to advising purchasers to use some suitable cathartic drug in connection with the malaria treatment if constipation occurs.

W. G. Campbell,
Commissioner of Food and Drugs.

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ANTHELMINTICS FOR DOGS

The Food and Drug Administration has received over a period of years numerous complaints of deaths of animals, particularly dogs, allegedly due to the administration of anthelmintics.

Anthelmintics, in order to be effective, must be given in doses which cannot be considered free from harm. In some cases they may actually be the primary cause of the death of the animals to which they are administered. More frequently perhaps they aggravate the disease condition already existing, thereby hastening death.

It is a matter of common knowledge that owners of animals, especially owners of pets, have within recent years become "worm-conscious" and have sometimes reached the erroneous conclusion that most ailments of pets as well as other animals are associated with or directly due to worm infestation. This has led to the extensive use of anthelmintics where they were not indicated.

This Administration has had extensive correspondence with manufacturers of anthelmintics in which it has pointed out that effective doses of anthelmintics cannot be administered safely to animals under all conditions. The Federal Food, Drug, and Cosmetic Act requires that drugs be labeled with adequate directions for use and adequate warnings against misuse. It defines as misbranded drugs which are dangerous to health when used in accordance with the directions provided in the labeling. To avoid conflict with the requirements of the Act these provisions should be given careful consideration. Some such information as the following, conspicuously displayed in connection with the directions for use of anthelmintics, would be in the user's interest and would contribute toward compliance with the requirements of the law:

"Warning: All known effective anthelmintics (worm remedies) are more or less toxic to animals. This preparation should not be administered to sick, feverish, physically weak, or undernourished animals unless on the advice of a veterinarian."

W. G. Campbell,
Commissioner of Food and Drugs.

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PUBLIC HEALTH PHYSICIAN I

The Merit System supervisor, Mr. Jack H. Foster, has issued information to those who wish to apply to take the examinations for public health physicians. The information as to Grade I physician is reprinted below. The higher grade appointments information may be obtained from the Merit System supervisor in Baton Rouge or from the State Department of Health in the Civil Courts Building, New Orleans.

Kind of work: Professional medical work in administering a generalized public health program in an assigned area, including clinic activities in venereal disease control, and maternal and child health; and related work as required.

Distinguishing features of work: Work involves responsibility for planning and executing a generalized public health program in a parish of small or moderate size with responsibility for adapting the state health policies and procedures to meet local situations, and for planning and executing according to local needs specialized programs in maternal and child health and communicable disease control. Duties entail coordinating the activities of the parish health unit with the activities of other agencies engaged in protecting and promoting public health. Supervision is received from public health physicians of higher grade in broad outline. Supervision is normally exercised over a small group of public health nurses, sanitation inspectors, clerical personnel, and in some cases part-time clinic physicians.

Examples of work: (Note: These examples are intended only as illustrations of the various types of work performed in positions allocated to this class). Plans and executes a generalized public health program, including clinic activities, in an assigned area. Plans and executes in accordance with local needs, specialized programs in maternal and child health, including maternity clinics, infant, pre-school, and school examinations; in venereal disease control, including clinics for administering drugs; programs for the control of infectious and contagious diseases, including immunizations against smallpox, typhoid fever, diphtheria and other diseases. Investigates suspicious contagious and infectious diseases in cooperation

with the medical profession. Plans and supervises the execution of programs designed to improve the environmental sanitation of the community. Studies the living conditions of the community in their relation to health and sets up machinery for the protection of the community health. Serves as general executive officer of the parish health unit, and as agent of the state health department in securing appropriations from local bodies for the operation of the health unit. Investigates violation of public health laws and institutes legal proceedings where necessary. Gives lectures and writes papers of a promotional and educational nature for the advancement of public health.

Necessary knowledges, skills, and abilities (At time of appointment): Good knowledge of the principles and practices of general medicine and surgery as related to public health, and of the methods, techniques, and objectives of preventive medicine. Knowledge of public health laws and regulations and of available public health facilities. Skill in making differential diagnoses, particularly in communicable diseases, and in determining the need for and instituting precautionary control measures, as isolation, immunization, and clinical care and treatment. Ability to execute a generalized public health program adopted to local needs. Ability to advise professional persons, local officials, and patients as to the requirements and procedures involved in public health programs. Ability to gain support and cooperation in the conduct and development of the public health program. Ability to speak effectively on public health subjects before lay and professional groups.

Required preparation for work (Federal minimum requirements): Graduation from a medical school of recognized standing, and completion of an approved one-year rotating internship, preferably supplemented by related clinic or graduate work in public health.

Necessary special qualifications: Eligibility for licensing to practice medicine in the State of Louisiana.

INFECTIOUS DISEASES IN LOUISIANA

The morbidity report of the Section of Epidemiology of the Louisiana State Board of Health shows that for the week ending August 15 as usual syphilis led all other reportable diseases with 454 instances, followed by 92 of gonorrhea, 21 of pulmonary tuberculosis, and 20 of malaria. This particular week is really an outstanding week from the health point of view, in so much as there were only four diseases reported in numbers greater than 10. Of the unusual diseases a case of poliomyelitis was reported from East Baton Rouge Parish and one from Washington Parish. There were four cases of typhus fever listed, three from Vermilion and one from Jefferson Parish. One case of undulant fever was reported. For the succeeding week again the health report was remarkable. Had it not been for the 429 cases of syphilis, 44 of gonorrhea, 32 of pulmonary tuberculosis, and the 19 of malaria plus 12 of typhoid fever, the record would almost be comparable to that of the previous week. Three cases of poliomyelitis were listed in this particular week, one each from Calcasieu, Cameron, and Winn Parishes. The typhoid fever cases were scattered throughout the state, Winn with three, Iberia with two being the only parishes with more than one case. Four cases of typhus fever were found this week as well. August certainly was a very healthy month. Except for the three venereal infections, syphilis with 290 cases, gonorrhea with 181, and chancroid with 23, pulmonary tuberculosis with 27 cases was the only other reportable disease occurring in numbers greater than 10 during the week of August 29. Sporadic cases of poliomyelitis were still appearing this week, Calcasieu and Livingston each reporting one case. Ouachita reported three cases of typhoid fever, and three other parishes one each. Forty-six cases of syphilis, 157 of gonorrhea, 21 of chancroid were reported from army camps. The first week in September, which statistically closed September 5, maintained the high remarkable record of August. Only three diseases were reported from the state in numbers greater than 10, and two of these were venereal diseases, syphilis with 296 and gonorrhea with 61. The 34 cases of pulmonary tuberculosis was the only other disease of any moment numerically. Five parishes reported patients with typhoid fever, and Vermilion had two cases of typhus fever, while Livingston Parish reported five of malaria.

HEALTH OF NEW ORLEANS

The Bureau of the Census, Department of Commerce, reports that for the week ending August 15, there were 46 more deaths reported in the City of New Orleans than the previous week which was, however, quite unusual. For this week there were 138 people who died in the city, 86 of whom were white and 52 negro. Only five of the deaths were in infants under one year of age. The 124 deaths that occurred in the week which ended August 22 were divided 77 white and 47 negro, with 18 infant deaths divided 10 negro and eight white infants. For the week ending August 29, there were reported 114 deaths in the city, 68 white, 46 negro, with nine infant deaths, two-thirds of which were in white children. The death rate for New Orleans is surprisingly low, and that despite the fact that there has been a considerable increase in the population of this city in the last year. The three year average for the corresponding week in August was 155 deaths. There were 418 fewer deaths in the city this year than last year, which incidentally was a very healthy year.

BOOK REVIEWS

Boletin del Instituto de Medicina Experimental: (For the Study and Treatment of Cancer). University of Buenos Aires. Director: Professor Angel H. Roffo. Vol. XVIII, No. 58, Dec. 1941, pp. 923-1317.

This encyclopedic volume of over 400 pages copiously illustrated, issued periodically by the Institute for Cancer Research and Treatment, of Buenos Aires, is in itself a monument to the unrivalled capacity and research and tireless industry of Dr. A. H. Roffo, the organizing genius who founded and has presided over this world famous institute for the last eighteen years. This number commemorates the admission of the hundred thousandth patient to the Institute since its foundation in 1923. These patients were given approximately 900,000 consultations, 500,000 radium, x-ray and electro-surgical treatment; in all about 1,400,000 patients attended in the hospital and dispensaries up to 1942.

The Institute which began in a small building, in 1923, has gradually evolved into a great hospital plant, including twelve tall buildings in which are housed the chemical, physical and biological laboratories, thoroughly equipped for experimental work with a large staff of experts in attendance. Drs. A. H. and A. E. Roffo (Jr.) and their assistants are the prolific authors of the many scientific studies that appear periodically in this review. In this issue they take up cholesterol in all its chemical, physical and biological relations with cancer; other articles deal with violet rays, x-rays and radium therapy, while the electro-surgical extirpation of laryngeal and rectal cancer are made the subject of special and full reports (296 laryngectomies for cancer from 1927 to 1930; 261 electro-surgical extirpations of the rectum by the perineo-pelvic route with 2 per cent operative mortality and 50 per cent five year cures).

The bibliography, abstracts and reviews of the latest cancer literature, make this publication valuable for reference. Quite apart from the purely scientific and technical features of this publication, a large space is devoted to the new training school for nurses, with special application to cancer therapy in all its polymorphous aspects. The details of this unique course are given in a well illustrated series of lectures by Prof. Roffo and staff. In this connection, also, the addresses delivered at the opening of the school and at the inauguration of other branches of the Institute in the Argentine, are profitable reading for all those who may be called upon to interpret the scientific and social problems of cancer in a lucid and impressive way to untrained lay audiences. After reading this remarkable document it is not surprising that a visit to the Roffo Institute at Buenos Aires has become an almost obligate function of every medical visitor to the great metropolis of the Argentine Republic.

RUDOLPH MATAS, M. D.

Boletino del Instituto de Clinica Quirurgica: Universidad de Buenos Aires: Director, R. C. Ferrari, M. D. Ano XVIII, Enero-Abril, 1942. No. 144.

This number of the Bulletin is of special interest to all surgeons who have kept in touch with the brilliant work of the surgical institute which Professor Arce founded as a department of the University of Buenos Aires twenty years ago and has since directed with great credit to himself, to surgery and to his country Dr. Arce is not only the Dean of Surgeons in the Argentine Republic and an outstanding international figure in virtue of his own epochal contributions to the advancement of surgery, but is the father of a school which had added no little to the fame of Argentine surgery.

This number of the Bulletin marks the date of the voluntary retirement of Professor Arce from the actual directorate of the Institute and the transfer of his title and authority to Professor Ivanissevich, his chief assistant since the foundation—and an eminent surgeon and teacher in his own right.

The formal transfer of the Directorate and head professorship of the Institute, which took place on April 23, 1942, was characterized by all the distinction of an academic function in which Dr. Arce recited the history and achievements of his successor and pupil, Dr. Ivanissevich spoke in eulogy of the master,—the speeches on both sides all aglow with the fervor, grace and eloquence that is so distinctive of Spanish oratory. Quite apart from these personal eulogies, Dr. Ivanissevich's inaugural lecture as head of the Institute was a dissertation of fine literary quality in which the seeming paradox of a constantly increasing perfection and efficiency in the technics of surgery contrasted with steadily decreasing indications and restrictions of its operative field and mutilating interventions. Contrary to the general belief, it would indeed seem that medicine is now gradually regaining its lost prestige by the great advances of preventive medicine, the extinction of many surgical diseases, besides a more effective systemic and pharmacologic therapy.

At this moment a great wave of enthusiasm in the study of the Spanish language and culture is sweeping the country in response to a call for a closer Pan-American cooperation and solidarity in the presence of a common peril. It would seem profitable for medical readers to subscribe to the publications of the high character of this and the Bulletin of the Roffo Institute, previously described, not only for their great professional and

technical value but for the sake of the fine lessons in correct and elegant academic medical Spanish that they inculcate.

RUDOLPH MATAS, M. D.

A Bibliography of Aviation Medicine: By Ebbe Curtis Hoff and John Farquhar Fulton. Springfield, Ill., Charles C. Thomas, 1942. Pp. 237. Price $4.00.

It is seldom that the two requisites of excellence in content and fulfillment of urgent need, are satisfied so completely as in this Bibliography of Aviation Medicine. Dealing with a field new to most physicians and research workers alike, it should find a place in medical and technical libraries, and should be a part of the armamentarium of every physician assigned to aviation service.

The bibliography has been compiled for the Committee on Aviation Medicine, Division of Medical Sciences of the National Research Council, acting for the Committee on Medical Research of the Office of Scientific Research, Washington, D. C. Arrangement is by subject: History and General Aspects of Aviation Medicine, Special Physiology of Aviation and Conditions Simulating Flight; Special Pharmacology of Aviation and Conditions Simulating Flight; Special Psychology of Aviation and Conditions Simulating Flight; Aeromicrobiology; Diseases and Accidents in Aviation and Conditions Simulating Flight; Selection and Assessment of Efficiency of Flight Personnel; Training, Performance and Fatigue of Flight Personnel; Protection of Flight Personnel; Aviation and Public Health; Organization of Aviation Medicine; Special Problems, and General Studies in Aviation Medicine. The subject lists are cross-indexed by author to numbered references and an alphabetical index to subject refers to page.

More than 5,700 references are included from some 800 periodical files, as well as textbooks, monographs and systems. References are included to May, 1942. The reader is even advised to address Dr. Fulton for information as to the libraries in which the more unusual material may be found.

The volume is Number 5 of the Publications of the Historical Library of the Yale Medical Library. Reasonably priced and pleasing in format, it amply fills an urgent need in the field of military medicine, and may well set a pattern for other bibliographies on related subjects.

MARY LOUISE MARSHALL.

Carcinoma and Other Malignant Lesions of the Stomach: By Waltman Walters, B. S., M. D., M. S. in Surgery, D. Sc., F. A. C. S., Howard K. Gray, B. S., M. D., M. S. in Surgery, F. A. C. S. and James T. Priestley, B. A., M. D., M. S. in Experimental Surgery, Ph. D. in Surgery, F. A. C. S. Philadelphia, W. B. Saunders Company, 1942. Pp. 576. Price $8.50.

The reviewer has enjoyed reading this well edited contribution from the Mayo Clinic. The three principal authors, Walters, Gray and Priestley, with sixteen associates, have produced a magnificently illustrated investigation of gastric malignancy.

While the volume is credited with 576 pages, some 48 of these, introducing chapters, are either empty of or carry little printing. There is certainly no conservation of paper. In several instances a contributor has extended himself to lengths following textbook presentation; others have been too abbreviated. Individually, therefore, there is rightful criticism in one instance and praise in another.

Alvarez interestingly covers the historical aspects from Hippocrates' prognostic statements on black vomitus through Billroth's accomplishment on resections to a diagnostic evaluation of gastroscopy.

Morlock and Hartman rightfully emphasize the need for and accomplishment by cooperation of clinician, roentgenologist, gastroscopist, surgical pathologist and gastric surgeon. This is an ideal seldom attainable. The inconsistency of the usual criteria for benignancy is interestingly presented with the summarization that only the histologic pathologist can give a definite answer in each instance and that he alone should pass final judgment in the suspicious case.

Kirklin roentgenologically surveys the issue and emphasizes the importance of capable mucosal delineation. His statements on resectability, as determined by x-ray, are interesting and revealing.

Moersch presents briefly and perhaps inadequately the position of gastroscopy. He is not as enthusiastic over gastroscopy as one might expect. He gives interesting observations on the differential diagnosis by direct visualization. I am surprised that there is no little mention of post-resection observations. His section includes gastrophotography, but there is no mention of this interesting if unsatisfactory procedure.

Eusterman elaborates on laboratory procedures and their relation to the progress of the disease. His observations, resulting from his extensive experience, are interesting, conclusive and summarize thoroughly the present day knowledge on the subject.

An unquestionably important and definitely neglected subject, the physiologic consequences of gastric carcinoma and of gastrectomy, is covered by Snell. It is disappointing that he does not also include the mechanical complications that often result in extremely disturbing symptoms in many of the gastrectomized patients we have seen.

The section on "Indications for Treatment" leaves a single valuable conclusion: Surgery alone

should determine the inoperability unless there are demonstrable metastases. I feel some mention of peritoneoscopy, completely omitted, was indicated in this section for demonstration of hepatic metastases by peritoneoscopy in instances otherwise considered operable has been our experience.

Broder classically handles the pathologic considerations as does McCarty the surgical pathology. There is instructive correlation of prognosis as related to degree of malignancy as expressed by Broder's classification. One is astonished to find 60 per cent of persons from whom a carcinoma graded 1 or 2 had been removed achieve a "five year cure" while only 21 per cent of those graded 4 are found alive after such a period.

Listed under special diagnostic problems, and worthy of emphasis, is the consideration given the great distortion associated with perforating growths of the upper stomach when producing fixation to the pancreas. An interesting case report on the value of deep therapy in lymphosarcoma of the stomach emphasizes the indication for exploratory and biopsy in apparently inoperable instances.

The preoperative management of the patient deserves the attention it is given. Unquestionable proper preoperative care is greatly responsible for the improved statistics. Some mention should have been given to detailed therapeutic control of the inflammatory status of the lesion; many a neoplasia is insignificant in size when contrasted with the extensive associated gastritis which unquestionably increases the operative hazard. There is no mention of the time honored use of dilute hydrochloric acid lavages preoperatively.

Rivers presents an interesting chapter on fluid balance without entering the mystic realms of physiological chemistry. The vitamins are covered without undue enthusiasm.

Technic in the operating room is only of academic interest to the average reader, but has been covered in such a manner that it might well serve as an operating room reference.

With regard to anesthesia, it seems Adams has not recognized sufficiently the value of spinal anesthesia. He seems biased toward inhalation gases. The use of intravenous barbiturates is lauded for its adjunctive value.

The fifteenth through the nineteenth chapters, covering 108 pages, is a thorough presentation on all the aspects of gastric surgery as applicable to malignancy. This section represents a beautifully illustrated condensation of surgery and surgical judgment.

In the postoperative management there are many important aspects too often forgotten. The operating room corps frequently expose the patient unnecessarily in removing drapes, leaving a partially exhausted patient practically unclad in an air-conditioned room. The position of supportive fluids and vitamins, the use of continuous suction, the immediate complications, all are considered in a manner illustrative of why the surgical accomplishments of the Mayo Clinic are so astounding.

Desjardins gives 20 pages of condensed readable evaluation of palliative and supplemental roentgenologic therapy.

The statistical study is remarkable; 10,890 cases of carcinoma of the stomach seen at the Mayo Clinic in the years from 1907 to 1938 are broken down in a detailed survey. Tabulation of survivals adjusted for normal death rate of persons past middle age reveals a brighter outlook for the resectionist. The outstanding conclusion is that gastric malignancy is not as hopeless as commonly believed by most physicians. If this is well accepted and earlier surgery is offered more frequently, there will be an increase in operability and thereby curability.

On the whole, even the most critical reviewer must admit this a remarkable publication only achievable by a cooperative organization like the Mayo Clinic. This volume will be instructive reading to the accomplished specialist as well as to the general practitioner. In addition, the student and statistician will find this an unparalleled reference.

GORDON MCHARDY, M. D.

Surgery of the Ambulatory Patient: By L. Kraeer Ferguson. Philadelphia, J. B. Lippincott Company, 1942. Pp. 923, illus. Price $10.00.

The experienced surgeon is recalcitrant at the thought of distinguishing between "major" and "minor" surgery. He has learned by bitter experience that such a distinction is unsatisfactory, and the classification is influenced by too many variable factors. What are commonly known as "minor" surgical procedures can and frequently do become "major." Depending upon the skill, training, and experience of the surgeon the same procedure may be considered "minor" for one and "major" for another. On the other hand, it cannot be denied that there are a group of surgical conditions and procedures that are associated with considerably less risk and hospitalization than others. By using the title "Surgery of the Ambulatory Patient," the author of this book has neatly and intelligently avoided this controversy and permitted a rational classification.

The book is divided into three parts. The first is devoted to surgical principles and lesions in which necessary paraphernalia, appropriate anesthesia and dressings and bandages are described, and the character and treatment of specific lesions discussed. The second part deals with regional injuries, surgical lesions and applicable therapeutic methods. The third part is concerned with the treatment of fractures and dislocations in the ambulatory patient.

The subject material is comprehensively considered and skillfully arranged. The descriptive text

which is written in a lucid, readable style incorporates current concepts. Following each chapter there is a list of references which in general are fairly representative. In this connection, references to scalenus anticus syndrome are conspicuously absent and especially the diagnostic procedure, originally suggested by Gage, of novocain injection of the scalenus anticus muscle which is even illustrated. A more serious criticism, however, is the fact that some surgical conditions and procedures are presented which even in the hands of well-trained and skillful surgeons would be better considered "non-ambulatory." Thus, the excision of a thyroglossal cyst or sinus is described and illustrated as a procedure which may be performed "in ambulatory patients." Other even more extensive procedures are included and whereas in Ferguson's expert hands they may be safely considered in this category it is doubtful whether they should be presented as such in a text for general use. These considerations restore the previous dilemma of distinguishing between "major" and "minor" surgery, clearly exemplifying the reluctance of experienced surgeons to employ such terms.

Aside from these criticisms, however, the book is a valuable, authoritative and instructive presentation. The profuse but well selected illustrations consisting of photographs and simple line drawings are well reproduced and clearly informative.

MICHAEL DEBAKEY, M. D.

Urology In War: Wounds and Other Emergencies of the Genito-urinary Organs, Surgical and Medical: By Charles Young Bidgood, Lt. Commander (M. C.) U. S. N. R. Baltimore, Williams and Williams Co., 1942. Pp. 78. Price $2.00.

The foreword, as expressed by Ross T. McIntire, Surgeon General, U. S. Navy, relates in a very terse manner the value of this manual to those not specialists in urology. I might add to those who have had no experience in emergency surgery, as many of the conditions considered are encountered by the emergency surgeon in civil life due to compensation accidents, automobile accidents, brawls and other accidents.

Chapter three deals with Inflammatory Lesions of the Genito-Urinary Tract in a most concise manner, although no mention is made of the chloride or gluconate of calcium in the treatment of acute epididymitis. The colon bacillus group is occasionally encountered in perinephritic abscesses.

Anesthesia is given due consideration as to choice, preparation of the patient, indications and contraindications of the different types with their limitations and the antidotes for the toxic effects.

MONROE WOLF, M. D.

Eye Manifestations of Internal Diseases: By I. S. Tassman, M. D. St. Louis, C. V. Mosby Co., 1942. Pp. 542. Price $9.50.

This complete, well-arranged and up-to-date reference book is written especially for the ophthalmologist interested in the detailed relationship of the visual mechanism to the other bodily functions. It is a compilation of the world literature as paraphrased by the author, combined with the results of his many years of personal experience. The 550 pages which are especially well illustrated are grouped into five principal sections. The first is devoted to the anatomy and pathology of the visual apparatus, the former in greater detail, and the latter in lesser detail than would be expected in a volume on this subject. The examination of the eye and the patient is presented in the second section. The chapter "Examination of the Iris" is incorrectly captioned, because it includes the entire posterior part of the eyeball. "Congenital and Hereditary Eye Manifestations" are then detailed. Unfortunately, the author does not sufficiently emphasize the fact that many hereditary eye manifestations are at birth only tendencies. These, if uncompensated, later result in pathologic conditions of numerous types.

In the fourth section, infectious diseases are presented in seven chapters, approximating 150 pages. A chapter on drug and chemical intoxicants follow. The last section of about 150 pages is devoted to diseases of the different bodily systems as they affect the eyes.

The table of contents is especially complete, useful, and well-arranged. The author is to be congratulated upon the adequate, practical and simple manner in which he has presented an important but complex ophthalmic subject.

CHARLES A. BAHN, M. D.

Morris' Human Anatomy: A Complete Systematic Treatise: Edited by J. Parsons Schaeffer, A. M., M. D., Ph. D., Sc. D. 10th Ed., Philadelphia, The Blakiston Co., 1942. Pp. 1635. Price $12.00.

For many years the most popular textbooks of general anatomy have been those which treated the systems of the human body one by one in a rather detailed manner. True, some teachers of anatomy have found the cyclopedic scope of these texts too broad for their purposes, particularly with the recent trend to curtail curricular time in anatomy and dissection. However, briefer treatments of the subject or topographic and regional approaches have not been satisfactory to meet the needs of the student or the practitioner who desires an almost all-inclusive reference book. Such an exhaustive treatise of the structure of the human body is available in a single volume in this, the tenth edition of Morris' Human Anatomy. It undoubtedly is a thorough and complete text.

Under the new editorship of Professor J. Parsons Schaeffer, this outstanding American textbook of anatomy has been revised, in large part rewritten, amplified and brought up to current thought.

Several new contributors have replaced or joined those of the previous edition: Professor Harold Cummins of Tulane—the Skin and Mammary Gland; Professor J. C. B. Grant of Toronto—the Musculature; Professor Bradley M. Patten of Michigan—the Cardiovascular System; Professor Olaf Larsell of Oregon—the Nervous System; Dr. Raymond F. Blount of Minnesota collaborating with Professor C. M. Jackson, the former editor of the book—the Digestive System.

There are numerous new illustrations and many others have been improved and recut. Particularly noteworthy are the light hues in the coloring of muscles and bony areas of muscle attachments. The reader will note a new typography, a very readable and eye-pleasing old-faced type. The anglicized BNA terminology predominates, and recent revisions of the Jena Nomina Anatomica (INA) are added parenthetically. An exhaustive index of 118 pages facilitates finding the subject about which information is desired.

To the reviewer, leafing through the new edition of Morris' Human Anatomy is like meeting an old friend, who, overnight as it were, has prospered. Though there is a different hue to his complexion, a new turn to his gait, and a changed outlook on the world, the familiar features of the reliable friend are there, and he promises to be even more faithful than he has even been.

CHARLES MIDLO, M. D.

Health Education of the Public: By W. S. Bauer, B. S., M. D., and Thomas G. Hull, Ph. D. 2nd ed. rev. Philadelphia, W. B. Saunders Company, 1942. Pp. 315, 52 illus. Price $2.75.

The publishers' statement, "a factual handbook for all workers in the field that will prove particularly helpful in organizing and conducting the many branches of an effective health education program," aptly describes this new edition.

The manual outlines the various technics found by experience to give satisfactory results in health education, and points out difficulties inherent in certain other methods. The chapters on health meetings, use of motion pictures, preparation of exhibits and writing of newspaper articles, have been completely revised. A particularly good chapter is included on the use of the radio for communication of health education. Careful attention is given to the listing of full references to source material.

This book should be of value to any physician devoting even a small portion of his time to health education.

RALPH H. HEEREN, M. D.

PUBLICATIONS RECEIVED

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J. B. Lippincott Company, Philadelphia: Human Pathology, by Howard T. Karsner, M. D.

W. B. Saunders Company, Philadelphia: Clinical Anesthesia, A Manual of Clinical Anesthesiology, by John S. Lundy, B. A., M. D.

Charles C. Thomas, Springfield, Ill.: A Handbook of Allergy for Students and Practitioners, by Wyndham B. Blanton, M. A., M. D., Litt. D. Medical Progress Annual, Volume III, 1942, edited by Robert N. Nye, M. D.

Lea & Febiger, Philadelphia: Shock, Its Dynamics, Occurrence and Management, by Virgil H. Moon, A. B., M. Sc., M. D.

Interscience Publishers, Inc., New York, N. Y.: Blood Grouping Technic, by Fritz Schiff, M. D. and William C. Boyd, Ph. D. Advances in Pediatrics, Volume 1, Editor Adolph G. De Sanctis, M. D. Advances in Internal Medicine, Volume 1, Editor J. Murrary Steele, M. D.

Mack Printing Company, Easton, Pa.: The Pharmacopoeia of the United States of America, Twelfth Revision, prepared by the Committee of Revision and Published by the Board of Trustees, official from November 1, 1942.

The C. V. Mosby Company, St. Louis: Synopsis of Pathology, by W. A. Anderson, M. A., M. D. Traumatic Surgery of the Jaws, including First-Aid Treatment, by Kurt H. Thoma, D. M. D.